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C. A. B.
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FILE

TOUSSON (T. A.), NASH (SHIRLEY M.), & SNYDER (W. C.). **Influence of nitrogen and of glucose nutrition upon the pathogenesis of Fusarium solani f. phaseoli.**—Abs. in *Phytopathology*, **49**, 9, p. 552, 1959.

Droplets of nutrient containing spores of *F.s.* f. *phaseoli* [**38**, 723] were placed on excised bean (*Phaseolus vulgaris*) stems in moist Petri dishes. Pathogenesis occurred after a period of saprophytic growth on the host surface. A thallus formed regardless of the nutrient used; but whereas with glucose spore germination and growth occurred readily and initial pathogenesis was delayed, N, particularly from organic sources, induced earlier penetration and saprophytic growth was curtailed.

OLAVE L. (C. A.). **Resistencia de algunas variedades y líneas de Frijol (Phaseolus vulgaris L.) al Isariopsis griseola Sacc.** [Resistance of several Bean vars. and lines to *I. griseola*.]—*Acta agron. Palmira*, **8**, 4, pp. 197–219, 6 fig., 1958. [Engl. summ.]

Inoculations of the Algarrobo bean with *I. griseola* [**38**, 49] in Palmira, Colombia, resulted in the appearance of symptoms in 8 days, though they are more characteristic at 12 days. No difference in the degree of infection was observed in plants inoculated at 20 days and 30 days of age. In large-scale tests México 11, México 12, and Cauca 27a were highly resistant, Sánchez resistant, Sangretoro, Liborino, and lines 133 and 138 moderately resistant, Uribe Redondo, Pico de oro susceptible, and Panameño and Estrada Rosado highly susceptible.

SUGIMOTO (T.). **Studies on the sclerotial disease of Bean plants in relation to the mycelial development of the causal fungus.**—*Mem. Fac. Agric. Hokkaido Univ.*, **3**, 2, pp. 114–120, 3 graphs, 1959. [Jap. Abs. from Engl. summ.]

Sclerotia of *Sclerotinia sclerotiorum* [cf. **38**, 343] preserved for 6 months under laboratory conditions grew hyphae in loam mixed with kidney bean [*Phaseolus vulgaris*] powder in Petri dish and pot experiments but not in a pure loam. The hyphae grew up the stems of kidney bean and adzuki bean [*P. angularis*] and also up bamboo rods erected on plate cultures, but not up maize stems or glass rods. The fungus spread from potato dextrose agar [**38**, 669] over a glass partition on to adjacent media (even plain agar). Mycelium developed weakly in loam (2–4 mm. particles) but was stimulated by nutrient solution and was especially influenced by the C source [cf. **38**, 306].

HARJONO. **Pĕnjakit-pĕnjakit virus pada katjang pandjang.** [Virus disease in Cowpea, *Vigna sinensis*.]—*Indones. Abstr.*, **1**, 3, pp. 84–85, 1959.

In this paper presented at 1st Nat. Sci. Congr., Malang, Aug. 1958, transmission tests are described that showed *Aphis medicaginis* to be the only vector of cowpea mosaic virus [cf. **38**, 438]; the virus is not seedborne. Inactivation occurred after 10 min. at 60° C., or at a dilution of 1:100,000, or after 24 hr. at 25–30° *in vitro*. Opt. pH was 6·5. Of all plants inoculated only *Phaseolus lunatus* and *P. radiatus* proved susceptible.

Cowpea witches' broom virus [cf. **36**, 747], causing sterility, was transmitted mechanically and by *A. medicaginis*. Acquisition and inoculation feeding thresholds were both 5 hr. and infectivity could be retained for 8 days. All transmission tests to other hosts were negative and witches' broom viruses from groundnut and *Crotalaria anagyroides* failed to infect cowpea.

Szirmai (J.). **Vírusveszély a makói Hagymatermesztésben.** [Makó Onion crops threatened by yellow dwarf virus.]—*Növénytermelés*, **7**, 1, pp. 63–72, 3 fig., 1958. [Russ., Engl. summ.]

This disease has caused heavy damage in the Makó area, Hungary [map 46; **33**, 706]. A survey by the Res. Inst. for Plant Protection, Budapest, showed that it attacked 10–15% of the bulbs and 40–50% of the plants used for seed production, the total loss in yield amounting to more than 50%. Infected seed weighed less, but germination was not affected. Storage of bulbs was especially favourable for infection, which in 14·5% resulted in premature sprouting. The disease was transmitted by direct contact (about 70%) or by insects [cf. **33**, 575], as yet undetermined. Deformations of inflorescence symptomatic of stolbur were occasionally observed.

Kononkov (P. F.). TMTD — Эффективный препарат для борьбы с грибными болезнями Моркови. [Thiram—an effective compound for the control of fungal diseases of Carrot.]—*Sad i Ogorod*, **97**, 10, pp. 28–29, 1959.

The records taken at the Gribov Vegetable Selection Station, U.S.S.R., in 1956–7 indicate that in the protection of carrot roots in storage against unspecified fungal rots 99·7% of Nant-skaya 4, and 96·4% of Moskovskaya zimnyaya were preserved if dusted with 50% thiram [cf. **37**, 414], and 94·8% and 89·8%, respectively, if treated with 13% NIUIF [loc. cit.]. Repeated application of thiram to roots before spring planting notably reduced losses from phomosis [*Phoma rostrupii*: **39**, 206] in plants for seed.

Sugimoto (T.), Miura (T.), & Kobayasi (J.). **Studies on the sclerotial rot of Carrot roots.**—*Mem. Fac. Agric. Hokkaido Univ.*, **3**, 2, pp. 121–127, 2 pl., 2 fig., 1959. [Jap. Abs. from Engl. summ.]

A sclerotial root rot of carrot, new to Japan, was caused by *Sclerotinia intermedia*. It is prevalent in the Towada district, Akita province, causing damage in winter under snow, usually occurring after 2–3 weeks of snow. At 0° C. *S. intermedia* from carrot and also from *Artemisia* grew better and faster than *S. sclerotiorum* [**39**, 257] and *S. trifoliorum* on potato sucrose agar, but at 5° and 13° there was almost no difference, whereas at 18° and 25° the 2 latter developed better than the others; the sclerotia of all 4 were larger and fewer at low temp. than at high, and those of *S. intermedia* from carrot and *Artemisia* were generally more numerous at every temp. tested. At 0°–3° the tissue of the crowns of carrot seedlings was attacked severely, but at 15° there were only slight signs of infection.

Zanardi (D.). **Un cinquantennio di prove di lotta contro la 'moria' del Peperone.** [Fifty years of tests on the control of die-back of Capsicum.]—*Notiz. Malatt. Piante* 49–50 (N.S. 28–29), pp. 18–28, 2 pl., 1 fig., 1 diag., 1959. [Engl. summ. 20 ref.]

The history of the control measures adopted by various workers in Italy since 1907 against the wilt or die-back of capsicum, previously attributed to fungi of the genera *Fusarium*, *Phytophthora* [**39**, 144], *Pythium*, and *Phoma* [cf. **37**, 394], is briefly recapitulated. The author's own observations [**37**, 435] have shown the fundamental importance of concomitant attack by eelworms of the genera *Heterodera* and *Meloidogyne* [cf. **32**, 509; **34**, 226, 453]. Recent attempts to control the wilt by soil fumigation with methyl bromide alone or with chloropicrin and DD gave promising results when fungicides were not sufficiently effective.

Takahashi (M.) & Ōishi (C.). **Studies on the mechanism of damping-off resistance in the plant seedlings. 4. Modification of the susceptibility induced by ether narcosis or abnormal conditions of environment.**—*Ann. phytopath. Soc. Japan*, **23**, 3, pp. 131–134, 2 fig., 1958. [Jap. Abs. from Engl. summ.]

In studies at Osaka Prefectural Univ., Sakai [cf. **36**, 746], young seedlings of

Amakuri vegetable marrow, highly resistant to *Pythium ultimum*, became susceptible after treatment with ether, ethanol, or chloroform, which was followed by unchecked growth of fungal hyphae in the host tissue. Susceptibility was also increased by high temp. Treatment with ether decreased respiration in the host tissues, which suggests a reduction of metabolic activities in the host cells following narcosis.

Gromov (N. G.), Romashevich (I. F.), Latȳshev (D. I.), & Tsareva (Mme A. D.). Применение заменителей конского навоза для культуры шампиньонов. [The use of substitutes for horse manure in the cultivation of mushrooms.]—*Sad i Ogorod*, **97**, 10, pp. 24–28, 1 fig., 1959.

Observations and measurements made in the laboratories of the State farm 'Belaya dacha' in 1957 and 'Teplichnȳĭ' in 1958–9 indicated that practically the same high yield (about 15 kg./sq. m.) obtained with horse manure could be obtained from cow and sheep manure mixed with straw (50–80% of the vol.); cow manure and sawdust [cf. **35**, 71; **38**, 648] proved the next best (about 9 kg./sq. m.). It is best to store straw in compressed stacks for more than 1 month before use.

Salerno (M.) & Musumeci (A.). **Contributo allo studio della 'degenerazione infettiva' della Vite in Sicilia. I. Indagine sui rapporti fra cordoni endocellulari e sintomi macroscopici della malattia.** [A contribution to the study of 'infectious degeneration' of the Vine in Sicily. I. Research on the relations between endocellular cordons and the macroscopic symptoms of the disease.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **16**, pp. 310–334, 1 pl., 1959. [Engl. summ. 23 ref.]

In field studies begun in Sept. 1958 branches of vines from various localities in E. Sicily presenting clear symptoms of infectious degeneration [cf. **37**, 569; **38**, 496 *et passim*] (3 branches of 10 vines of every var. in each district) were examined microscopically. There was great variability in the number of endocellular cordons [cf. **31**, 591; **33**, 464 *et passim*] present, not only in the different vars. but in the same var., and even in different shoots of the same plant.

Ciferri (R.), Corte (A.), & Scaramuzzi (G.). **Suscettibilità di piante arboree alla sindrome virosica della 'degenerazione infettiva' della Vite.** [The susceptibility of arboreal plants to the virus syndrome of 'infectious degeneration' of the Vine.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **16**, pp. 335–352, 6 pl., 1959. [Engl. summ.]

An expanded account of work already noticed [**39**, 208].

Zanotti (L.). **La peronospora della Vite nel 1957 e la lotta con acuprici.** [Vine downy mildew in 1957 and control with non-copper compounds.]—*Notiz. Malatt. Piante* 49–50 (N.S. 28–29), pp. 68–89, 1959.

In 1957, when weather favoured the development of vine mildew (*Plasmopara viticola*), numerous vine vars. in the Trentino area were sprayed with aspor A, 87% commercial zineb (71% pure zineb), or aspor C (94% commercial zineb or 78% pure zineb) [**38**, 123; **39**, 209]. The first 3 applications were at 200 g. aspor A or 150 g. aspor C/100 l. water, the remaining 6–9 at 300 or 200 g. The results, fully tabulated and discussed, showed that both aspors were completely effective and might well replace Bordeaux mixture, which injured the flowers and leaves and appeared to cause a partial arrest of growth. Peaches, plums, apples, tomatoes, and potatoes growing among the vines and also treated with aspor remained healthy throughout and yielded very well.

Miotto (G.) & Martini (A.). **Concentrazione della politiglia bordolese e del rame residuo dopo pioggie.** [The concentration of Bordeaux mixture and the copper

residue after rain.]—*Notiz. Malatt. Piante* 49–50 (N.S. 28–29), pp. 31–35, 1959.

In preliminary experiments to ascertain whether repeated sprayings of vine at short intervals with Bordeaux mixture against downy mildew [*Plasmopara viticola*: cf. above] are more important in achieving control than the initial conc. of the mixture, leaves of Merlot vines sprayed with Bordeaux containing 0·33%, 0·67%, and 1% $CuSO_4$ were tested for loss of Cu between the 8th and the 9th application (on 28 June and 3 July). On 1 July 3·5 mm. of rain fell, on 2 July 1 mm., and on each night from 28 June–3 July the leaves were wet with dew for at least 8 hr. The results showed that Cu loss averaged only about 10%, and therefore it would appear best to use a low conc. of $CuSO_4$ and spray frequently.

Aĭvazyan (P. K.) & Dokuchaeva (Mme E. N.). Новые устойчивые формы Винограда на Украине. [New resistant forms of Vine in the Ukraine.]—*Sad i Ogorod*, **97**, 10, pp. 64–66, 2 fig., 1959.

Three selections resistant to mildew [*Plasmopara viticola*: **38**, 649], bred at the Tairov sci. res. Inst. of Viti- and Viniculture, were 1–29–60 (Sereksiya × Rupestris du Lot), 1–38–47 (Sereksiya × Riparia × Rupestris 3309), and the hybrid 12–3–11 (Sereksiya × Amurskiĭ on Rupestris du Lot).

Chiarappa (L.). **Extracellular oxidative enzymes of wood-inhabiting fungi associated with the heart rot of living Grapevines.**—*Phytopathology*, **49**, 9, pp. 578–583, 2 graphs, 1959. [29 ref.]

In further studies at Univ. Calif., Davis [cf. **39**, 151], *Stereum hirsutum* produced laccase but no peroxidase in a liquid medium (modified Dion's; *Canad. J. Bot.*, **30**, pp. 9–21, 1952; or Sequeira & Steeves' [**33**, 601]) and on vine sawdust, the amount being related to the composition of the medium, pH, presence of phenolic substances, and age of the colonies. Addition of Mn or Cu ions to dialyzed culture filtrates increased laccase activity. No laccase was found in ground mycelial extracts of the fungus, nor tyrosinase or peroxidase in culture filtrates. *Fomes igniarius* [cf. **35**, 408] produced abundant peroxidase and much more laccase than *S. hirsutum* in the liquid media. These results suggest that substances inhibiting peroxidase and laccase might control wood decay.

Graniti (A.). **Un anno di infruttuosa lotta contro la 'muffa grigia' (Botrytis cinerea Pers.) delle Uve da tavola in Puglia.** [One year of unsuccessful attempts to control 'grey mould' (*B. cinerea*) of table Grapes in Apulia.]—*Notiz. Malatt. Piante* 49–50 (N.S. 28–29), pp. 167–187, 3 fig., 4 graphs, 1959. [Engl. summ. 27 ref.]

In Sept. and early Oct. 1958 the fruit clusters on Regina vines growing in Apulia were sprayed 3 times against *B. cinerea* [cf. **36**, 678; **37**, 756, *et passim*] with 0·2% orthocide 50, pomarsol forte, brassicol super, or nirit, and 0·25% aspor C, dusting with brassicol and with 15% tetrasan + 85% S also being carried out. No treatment gave satisfactory control, though pomarsol, tetrasan, and orthocide appeared to reduce losses to some extent and the last, in addition, to prevent secondary rots of affected berries in the field.

Annual Report 1958, Glasshouse Crops Research Institute.—94 pp., 3 pl., 2 graphs, 1 plan, 1959.

In the mycology and virology section (pp. 52–58) under P. H. Williams [cf. **38**, 290] he reports that plant nutrition appeared to have no effect on the infection of Potentate tomatoes by stem rot (*Didymella lycopersici*). In tomato plants at 52°, 62°, and 72° F. the disease developed slightly more rapidly at the lower temps., but final incidence was the same as at temps. employed in glasshouse practice.

In further work on other hosts of cucumber mildew [*Erysiphe cichoracearum*]

Olwen M. Stone found that on *Sonchus oleraceus* only small, red spots were produced, though typical infection developed on about 50% of *S. arvensis* plants and 90% of *S. asper*. The fungus was re-transferable to cucumber after 3 successive transfers to susceptible *Sonchus* spp. The percentage of *Sonchus* plants infected varied from none in June to 90% in Oct., though temps. in the glasshouse were similar. The mildew on naturally infected *Chrysanthemum carinatum*, but not that on *C. segetum*, was transferred to cucumber, *S. asper*, and *S. arvensis*. Few *Ranunculus repens* plants could be infected experimentally, and no transfers could be made from the inoculated plants.

Itersonilia perplexans caused considerable damage to chrysanthemum flowers on plants grown out of doors or in cold houses. An isolate from parsnip canker [**38**, 562] did not infect chrysanthemum, nor vice versa.

Marion H. Ebben soaked pieces of sterilized match sticks for about 5 hr. in broth cultures of 4 carnation pathogens and 2 common saprophytes and after applying 7 methods of surface sterilization plated them on potato dextrose agar. Except dipping in 70% alcohol and placing in $AgNO_3$ the methods were universally effective. Alcohol did not eliminate either of the 2 bacteria tested. Silver nitrate was ineffective against *Fusarium oxysporum* f. sp. *dianthi* [*F. dianthi*], *Chaetomium* sp., *Pectobacterium carotovorum* [*Erwinia carotovora*], and a saprophytic Gram— bacterium. In further surface sterilization tests natural surface contaminants on carnation cuttings after 0·1% $HgCl_2$ and 7% calcium hypochlorite, for 15 min. each, reached 32%, the lowest from 4 treatments used. It might be possible to combine $HgCl_2$ and 8 hydroxyquinoline sulphate treatments if upward penetration in the xylem by the former is not too great. Bacterial contamination of carnation cuttings appears as either a diffuse or a surface growth in broth tubes; many of the bacteria were Gram+ spore-formers. They were largely decreased by crystal violet.

Three plots in one carnation greenhouse were steamed in Feb. 1958 after removal of the 3½-yr.-old plants. The fungus flora was examined 10 days and 4 months later. In the steamed soil the numbers of fungi increased from 12,000/g. dry soil to 80,000, mainly in *Trichoderma* sp. In the unsteamed numbers fell from 194,000 to 113,000/g. dry soil, and *Penicillium* spp. were predominant. *F. roseum* was isolated from both the steamed and the unsteamed soil at the 2nd sampling.

R. Howles (pp. 87–88) tabulates the results of experiments with a number of systemically distributed chemicals in attempts to prevent the spread of tobacco mosaic virus in tomato. The results obtained were generally negative.

Sixth Annual Report, 1958–9, Scottish Horticultural Research Institute.—74 pp., 1 pl., 2 plans, 1959.

In the virology section (pp. 36–42) of this report [cf. **37**, 697], some of the information in which has already been noticed, C. H. Cadman states that raspberry ring spot [raspberry Scottish leaf curl virus: cf. **38**, 268, 532], hitherto known only in Britain, was isolated from each of 3 samples from sweet cherry trees affected by Pfeffinger disease [cherry rasp leaf virus] sent from Switzerland; viruses isolated from cherry in Germany and England were also found to be strs. of raspberry Scottish leaf curl virus.

Raspberry yellow dwarf virus [cf. **38**, 217, 561] was found to be serologically related to Arabis mosaic virus [cf. **23**, 363] and was also isolated from horse-radish plants from Denmark and from elder from Perthshire. A virus isolated from cherry also proved to be a str. of Arabis mosaic virus. As with tomato black ring virus [cf. **38**, 268], Scottish isolates of raspberry Scottish leaf curl and Arabis mosaic viruses are more closely related to the English than to continental ones.

Viruses of the tobacco-rattle type [cf. **39**, 221, 240] are inefficiently transmitted through the tubers of Kerr's Pink. Work by J. Chambers showed that when leaf roll infectors colonized by *Myzus persicae* were exposed for fortnightly periods from

June–Sept. in a crop of healthy Majestic potatoes, the virus spread most from those exposed in late June and early July and not at all from these exposed after mid-July [cf. **38**, 762].

In the mycology section (pp. 43–45) by A. R. Wilson, W. R. Jarvis reports that in 1958 infection of raspberry fruits by *Botrytis cinerea* [cf. **37**, 698] ranged from 7% in Malling Jewel to 51·4% in Malling Promise. In tests on Malling Exploit raspberry plants and Talisman strawberries no fungicide was as generally efficient as captan spray (2½ lb. 50% wettable powder/30 gal./acre) or captan 3% dust (21 lb./acre). In fruit stored overnight rotting was caused by *Rhizopus nigricans* [*R. stolonifer*], frequently associated with *B. cinerea*, and was occasionally present on berries in the field. In 1 experiment the mean number of Talisman strawberries which developed perceptible infections overnight was reduced from 6% to 3·7% ($P = 0{\cdot}05$) by storage in chip baskets treated beforehand with copper-8-quinolinolate, but there was no reduction in mean numbers of Malling Exploit raspberries affected.

A. R. Wilson found that the morphological characters of isolates from tomatoes affected by grey mould suggested that all were *Botrytis cinerea*, though cultures varied widely in gross appearance. Preliminary experiments indicated some variation in ability to infect tomato stems through fresh leaf scars. Virtually 100% infection was secured by cauterizing a small part of the fresh leaf scar with the tip of a hot wire before inoculation. The necrotic spot produced provides a substrate for saprophytic growth and so facilitates subsequent invasion of the healthy tissues below. A species of *Phytophthora*, apparently *P. cactorum*, was isolated from raspberry roots in E. Scotland by W. R. Jarvis and Isabel G. Montgomerie.

In the report from Auchincruive (pp. 46–50) Isabel Montgomerie describes how comparable strawberry plants of the same var. may react differently when inoculated with an isolate of *P. fragariae* [cf. **37**, 698]. Immunity from the most pathogenic races of *P. fragariae* available was rarer than immunity from less pathogenic races.

C. North reviews (pp. 64–74) recent researches on *Brassica oleracea*, one section (pp. 69–70) being devoted to pests and diseases, mostly already noticed [cf. **36**, 506 *et passim*].

Congresso mondiale della sperimentazione agraria. (World congress of agricultural research.)—1458 pp., illustrated, Rome, 7–9 May 1959, Sede della F.A.O., 1959.

This collection of papers includes the following of phytopathological interest. M. Yossifovitch (Univ. Belgrade) gave (pp. 463–482, Fr. text; Ger., Engl., Span., Ital. summ. pp. 483–488) a general survey of recent progress in the field of fungicidal products. T. Wallace (Univ. Bristol Res. Sta., Long Ashton) dealt (pp. 511–524, Engl. text; Fr., Ger., Span., Ital. summ. pp. 525–529) with trace element deficiencies and excesses and their control. Hildegard Carmesin (Inst. für Gemüsebau der Technischen Hochschule, Hanover) described (pp. 1289–1292, Germ. text; Fr., Engl., Span., Ital. summ. pp. 1293–1296) trials made to determine whether the growth of cucumber, cabbage, lettuce, carrot, and tomato is injured by seed treatment with excessive quantities of fungicidal dusts, in which the retention of the dusts, used in amounts equivalent to 0·2%, 1%, 5%, and 25% of the seed wt. was investigated and the phytotoxic effect of dosages of dust equivalent to 0·2–3·2% of the seed wt. determined. The results showed that the total quantities of dust retained depended on the type of seed and the nature and dosage of the dust and increased with dosage, except for cabbage seed treated with atiram [cf. **37**, 428]; retention of elbe (iron dimethyl dithiocarbamate) by cabbage seed was largely independent of dosage, and that of abavit increased with increased dosage. Phytotoxic effect was expressed in retarded germination rather than in reduced growth, the degree of retardation depending on the type of dust and dosage, as well

as on the susceptibility of the host. Injurious effects were produced on cucumber by excess abavit and cerenox, on cabbage by excess abavit, UT (phenyl mercury), and cerenox, on lettuce by excess abavit, UT, cerenox, and atiram, on carrots by excess UT and cerenox, and on tomatoes by excess abavit, UT, cerenox, atiram, and elbe.

M. Benlloch (Estación de Fitopatología, Madrid) dealt (pp. 1297–1300, Span. text; Fr., Germ., Engl., Ital. summ. pp. 1301–1303) with fungicides from the angle of the world-wide shortage of Cu. He reviewed the solutions found in Spain by modifying the classic formulae based on Bordeaux and Burgundy mixtures and using others in which the amount of $CuSO_4$ is reduced. Reference is made to other substitutes for various purposes.

G. Ubrizsy (Ungarisches Forschungsinstitut für Pflanzenschutz) gave brief summaries (pp. 1305–1310, Germ. text; Fr., Engl., Span., Ital. summ. pp. 1311–1316) of all the lines of research carried out by the Plant Protect. Inst. Two physiologic races of *Tilletia contraversa* have been isolated. A Hg treatment against covered smut (*T. foetida*) of winter barley was developed. A fast-growing biotype of this fungus was isolated. A technique was evolved for use on maize seed and seedlings against *Nigrospora oryzae*, *Gibberella zeae*, and *G. fujikuroi*, while for 'brusone' disease of rice [**37**, 282] an effective method of inoculation with *Piricularia* [*oryzae*] for classifying seedlings was devised. Attention is being given to the relation between the mechanism of plant growth and resistance to diseases, in particular the respiration chain-reaction in wheat and the protective effect of streptomycin against *Phytophthora*.

C. Sibilia (Staz. Pat. veg., Roma) reviews (pp. 1317–1321, Ital. text; Fr., Germ. summ. pp. 1322–1324) field work in Italy since 1949 with non-Cu organic fungicides against diseases. H. Braun (Bonn) describes (pp. 1327–1331, Germ. text; Fr., Engl., Span., Ital. summ. pp. 1332–1336) the fight against plant diseases within the framework of the European Economic Community. J. M. del Rivero (Estación de Fitopatología, Valencia) discusses (pp. 1385–1388, Span. text; Fr., Germ., Engl., Ital. summ. pp. 1389–1390) deficiency diseases of crops in Spain. S. D. Démétriadès & C. D. Holevas (Institut Phytopathologique Benaki, Athens) discuss (pp. 1391–1393, Fr. text; Germ., Engl., Span., Ital. summ. pp. 1394–1396) deficiency diseases of crops in Greece. J. J. Lehr & C. H. Henkens (Plant Nutrition Res. Lab., Chilean Nitrate agric. Serv., Wageningen, and Institute for Soil Fertility, Groningen) describe investigations (pp. 1397–1404, Engl. text; Fr., Germ., Span., Ital. summ. pp. 1405–1407) into the threshold values of B contents in Dutch soils in relation to B deficiency symptoms in beet (heart rot) [cf. **38**, 45]. In 1955, in warm, dry weather, heart rot occurred very frequently in sandy soils with a B content $< 0{\cdot}35$ p.p.m. In 1956 the weather was milder and incidence limited. A soil B content of 0·3 p.p.m. was established as the level above which plots were healthy and below which deficient; a threshold value 0·35 p.p.m. was adopted. The threshold value for the leaf blade appeared to be a dry-matter content of 30 p.p.m. B. Soil analysis is preferable to leaf analysis as a basis for practical work, as it enables curative measures to be undertaken at an early stage.

O. Verona (Ist. Pat. veg., Univ. Pisa) reviews (pp. 1409–1414, Ital. text, Fr., Germ., Engl., Span. summ. pp. 1415–1417) the literature (74 ref.) describing Italian studies on deficiency diseases in plants. Eugenie Davidesco (Bucarest) describes (pp. 1419–1420, Fr. text; Germ., Engl., Span., Ital. summ. pp. 1421–1422) pot tests with maize for the diagnosis of Mn deficiency by outward symptoms.

Sibilia (C.). **Rassegna dei casi fitopatologici più notevoli osservati nel 1958.** [Review of the most noteworthy phytopathological records made in 1958.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **16** (*1958*), 2, pp. 195–210, 1 fig., 1959.

This report [cf. **38**, 291] contains, *inter alia*, the following items. Vine downy

mildew [*Plasmopara viticola*] was serious only in the extreme S. of Apulia and some parts of Sicily. *Oidium* [*Uncinula necator*] was severe on vine only in Piedmont and a few localities in Liguria. Olives infected by *Cycloconium oleaginum* [cf. **38**, 415] should be sprayed during late Feb. in S. Italy and the Italian islands, in early Mar. in the centre of the country, and up to the beginning of Apr. in Liguria. *Citrus myrtifolia* in Imperia displayed symptoms of xyloporosis virus [**39**, 309], a new host record. In Mar. tomato plants at Vittoria (Ragusa) were severely attacked by *Phytophthora infestans*, always a spring threat to this host in Sicily. *Sansevieria* growing at Pescara developed leaf spotting with perforations caused by *Fusarium moniliforme* [*Gibberella fujikuroi*].

Rosa (M.). **Contributo ad una bibliografia fitopatologica italiana per l'anno 1958.** [A contribution to an Italian phytopathological bibliography for the year 1958.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **16** (*1958*), 2, pp. 211–233, 1959.

A list of 477 titles [cf. **38**, 350].

Böning (K.), Sprau (F.), Malmus (N.), Hinke (F.), & Wagner (F.). **32 Deutsche Pflanzenschutztagung 1958 in Hannover.** [Thirty-second German Plant Protection Conference, 1958, in Hanover.]—*Mitt. biol. BdAnst. Berl.* 97, xxii+ 239 pp., 44 fig., 9 diag., 29 graphs, 1 map, 1959. Abs. from *Pflanzenschutz*, **10**, 11, pp. 124–132, 1958.

Some of the papers presented at this conference [cf. **35**, 812] have been noticed from other sources. Current problems of plant virus research surveyed by [M.] Klinkowski, Aschersleben (pp. 125–126), included the chemical composition of viruses, their distribution in the plant, transmission, preventive measures, and pollen transmission. Potato rust spot [cf. **37**, 737] and plug formation (potato stem mottle virus) were dealt with by [E.] Brandenburg, Giessen (p. 126); the latter can be determined by the soil test with Samsun tobacco [**37**, 245], on which symptoms of 'mauche' disease develop. A dilution of 1:10–1:1,000 of infected sap used for inoculating potatoes reproduced the initial symptoms. At 1:10,000 β-type local lesions appeared; these seemed to develop best in winter. The virus is systemic when particles of both dimensions (70–200 mμ, 80% short and 20% long) [cf. **35**, 1; **38**, 650] are present in the plant. If the sap is diluted, the long particles disappear, and the β-type symptoms emerge. More infected plants were obtained in the presence of weeds, which indicates that an intermediary is required for transmission. Reporting on potato virus Y (tobacco vein-browning strs.) [**39**, 242], [O.] Bode, Brunswick (p. 126), stated that *Solanum demissum* strain A 6 is a very good test plant, particularly for dish tests with detached leaves. A definite temp. and light intensity are needed for good testing: at 10–15° C. and fairly high light intensity no symptoms appear; at 17° there are faint spots, and at 19° necrotic rings. High light intensities considerably weaken and retard the reactions; 24° and 1,000 lux are favourable. At 30° virus conc. is very low, and at 25° max. Fully grown leaves are most suitable; leaf sap should be used for inoculation, rubbing with the cut surfaces of diseased tubers being insufficient. On the serological test for potato virus Y [**37**, 500], [R.] Bartels, Brunswick, reported (p. 126) that at 15–20° the plant contains about 13 times as much virus as at 10° and this was found in 23% and 70% of the tubers of 77% infected Oberarnbacher Frühe plants in the unheated greenhouse and hothouse, respectively. [K.] Scheibe, Hanover, dealt (p. 126) with the experience gained at the Pflanzenschutzamt, Hanover, with colour tests for the determination of viruses in potato tubers. The callose test for leaf roll [**39**, 33, 185] enables the determination of primary infections with some certainty, but secondary infections give very varied results. It can be used for tuber pieces with very low (0–1%) and fairly high (15% and over) infection, but not efficiently for the 1–15% range. [J.] Völk, Brunswick, states that transmission

of tobacco vein-browning races of virus Y to tobacco and potato [**39**, 244] is performed by all aphids occurring on potatoes with the exception of *Macrosiphum solanifolii* [*M. euphorbiae*]; *Aphidula* [*Aphis*] *nasturtii* and *Cerosipha* [*A.*] *gossypii* are present in areas where *Myzus persicae* is absent. *M. persicae* and *A. nasturtii* are the most efficient. Grasshoppers can also occasionally transmit the disease.

[H.] Schmutterer, Giessen, reported on experiments (p. 127) in transmission of highly infectious plant viruses (mainly tobacco mosaic) by biting insects. No test plants were infected by sucking insects. With grasshoppers [**35**, 550] the mouth parts play the main role in transmission (up to 50%) and the decisive factor is the duration of feeding. The transmission rate for up to 2 min. feeding is almost constant, and only rises when the time is increased. Better transmission was obtained by alternating insects on healthy and infected plants than by placing first on a diseased plant and then on a series of healthy ones, of which only the first 5 generally became infected. The virus was inactivated, though reversibly, by saliva even at dilutions of 1:1,000, but not when the saliva was heated to 60° C. or KCN was added. Similar results were obtained with the yellow blood. Potato viruses X and Y are not transmitted so strongly, [tobacco] ringspot only up to 10%, and rattle [potato stem mottle] virus only very rarely. Quantitative determination of viruses on the basis of spectral absorption was discussed (p. 127) by [H.-L.] Paul, Brunswick [**39**, 93].

[K.] Schuch, Heidelberg, dealt (p. 127) with plum pox virus in prune plums, which occurs in Germany, in the Worms area. Phytosanitary control, especially in nurseries, came into force in 1959. In general, prune plum is more susceptible than plum. [Gisela] Baumann, Aschersleben (p. 127), working on the cherry Stecklenberg disease [? peach ring spot str.: **38**, 610], contrasted the incubation period of 1 yr. with that of the Pfeffinger disease [cherry rasp leaf virus: **38**, 530], which causes no symptoms in the 1st yr. The virus can be distinguished by its necrotic reaction on mountain ash [*Sorbus aucuparia*] leaves from the cherry necrotic ring spot virus reported from the Netherlands [**35**, 373], which causes only weak symptoms. Cucumber, inoculated by rubbing, developed symptoms of the Stecklenberg disease after 16 days, those of Pfeffinger after 26, and the Dutch virus after 44. A survey of economically important viroses in N. German fruit-tree nurseries was made by [G.] Hamdorf, York (p. 127). Speaking on the dissemination of strawberry viroses in conjunction with the appearance of strawberry aphids, [H.] Krczal, Heidelberg, stated (p. 127) that *Passerinia* [*Pentatrichopus*] *fragaefolii* is found mainly on the Rhine and the lower Elbe. Fundamentally there are 2 non-persistent viruses, but strawberry virus 1 [strawberry mottle virus: **37**, 414] alone causes little damage. The persistent viruses appear to play a subordinate role. The plants can be 'cured' by heat treatment at 37°. [G.] Borchardt reported (p. 128) on the development of strawberry propagation stock under the aegis of the Chamber of Agriculture, Hanover; testing for viruses is carried out by stolon grafting the East Malling clone of *Fragaria vesca*. Of 575 grafts, 88% took and there was virus transmission in 87%; with leaf grafting, infection occurred only in about 20%. Examination of each clone every 3 yr. is recommended.

Methods of soil disinfection and their problems were discussed by [W. H.] Fuchs, Göttingen (p. 128); [K. H.] Domsch, Kiel, spoke on studies on the effect of some soil fungicides [**38**, 455]; [B.] Weil, Hanover, discussed (p. 128) the significance of the subsoil as a reservoir for phytopathogenic fungi after disinfection; [K.] Naumann, Aschersleben, dealt (p. 128) with the effect of plant protection materials on the soil microflora [**38**, 65]; [J.] Ullrich, Brunswick (p. 129) with biological and meteorological aspects in relation to the spread and development of diseases and pests; and [K. V.] Stolze, Oldenburg, with the present position and future development of the plant protection forecasting service in Germany. In discussing means of utilizing regularity in development of apple scab [*Venturia*

inaequalis: **37**, 412] for forecasting purposes, [H.] Bömeke, York, stated (p. 130) that ascospore flight at the end of Mar./beginning of Apr. usually produced infection after approx. 3 weeks. Almost 90% of all infections occur in the ensuing 4–6 weeks (1 May–15 June), so that the blossom spray is particularly important. The main control period is mid-May–mid-June, when the long shoots are formed.

[K.] Böning, Munich, reviewed (p. 131) advances in the field of seed treatment and current problems; the selective influence of treatment on barley seed microflora was covered by [G.] Roth [**38**, 363]. [F.] Wagner, Munich, on the chemical control of loose smut [*Ustilago nuda*: **38**, 507], indicated (p. 131) that the use of pure methanol and solutions of substances in it presents difficulties in practice, as the steeping temp., water content of the barley seed, and especially its physiological condition, influence control and possible germination damage. The material shows promise only when substances are added to protect germination. The mode of action of soil disinfectants and fungicides on maize blister smut [*Ustilago maydis*: **38**, 592] was discussed (p. 131) by [E.] Mühle, Leipzig. Germisan and ceresan (dry, 200 g./dz.) gave good control of seed-borne infection; wet steeping, at 0·3 and 0·1%, respectively, was effective, but concs. of 2% and over reduced germination. Papers were also presented (p. 132) by [G.] Crüger, Fischenich, and [Hildegard] Carmesin, Hanover, on treatment of vegetable seed.

Diercks (R.). **Pflanzenschutzliche Versuchs- und Forschungstätigkeit der Bayerischen Landesanstalt für Pflanzenbau und Pflanzenschutz 1948–58.** [Experimental and research work on plant protection at the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, 1948–58.]—*Pflanzenschutz*, **11**, 1, pp. 2–14, 1959. [Numerous ref.]

A review of activities over the last decade. Among the problems to which particular attention has been given are virus diseases of potato, *Tilletia contraversa* infection of wheat, *Helminthosporium sativum* [*Cochliobolus sativus*] on barley and wheat, *Phytophthora infestans* on potato, *Cercospora* [*beticola*] on beet, and *Sclerotinia trifoliorum* on clover.

Bachthaler (G.). **Großtechnische Bekämpfungsmaßnahmen und Pflanzenschutzberatung in Bayern 1948–1958.** [Large-scale control measures and advice on plant protection in Bavaria 1948–1958.]—*Pflanzenschutz*, **11**, 1, pp. 14–22, 1959.

The activities of the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz in the field of practical plant protection, viz. eradication campaigns against particular pests and diseases, field trials, demonstrations, and advisory work during the last decade, are outlined [see above].

Nonveiller (G.) (Editor). **I Kongres stručnjaka za zaštitu bilja.** [First Congress of Plant Protection Specialists.]—*Zasht. Bilja* (*Plant Prot., Beograd*), *1958*, 47–48, 249 pp., 20 fig., 1 graph, 7 maps, 1958.

This Congress, held at Zemun, Yugoslavia, 29 Oct.–1 Nov. 1957, by the Society for Plant Protection of the Serbian People's Republic, was attended by 500 delegates from Yugoslavia and Bulgaria.

S. Todorović (pp. 15–63, Engl. summ.) made an extensive historical review of the problems, conditions, and development of plant protection societies in Yugoslavia. Vera Lušin & M. Panjan (pp. 65–66, Germ. summ.) reported on the results of a 2-yr. investigation of the field reaction of 34 potato vars. to wart (*Synchytrium endobioticum*) [**39**, 186]; Early Rose, Bintje, Erstling, Eigenheimer, Ella, Wohltmann, and Industrie were resistant. F. Janežić (pp. 67–71, Engl. summ.) described similar work in the Planina Pod Golico region, where Virginia, immune in Germany, proved susceptible. V. Masten (pp. 73–78, Engl. summ.)

dealt with a wilt of peach trees in Slovenia, associated with the invasion of mechanical wounds by *Valsa leucostoma* [cf. **39**, 118] and apparently favoured by lack of essential nutrients. The disease is becoming of great economic importance. Višnja Špehar & Zdenka Prpić (pp. 79–84, Engl. summ.), investigating stem rust (*Puccinia graminis*) [**36**, 391] races in Croatia, identified isolate Dubrovčak 2 as race 75 and Jaska 1 as 107 on Stakman's differentials; Dubrovčak 1 and Osijek 2 differed slightly from 54 and 75, respectively. A. Tominić (pp. 85–90, Fr. summ.) dealt with ecological investigations of vine mildew [*Plasmopara viticola*: **36**, 85] and attempts to organize a control service, and V. Šišaković (pp. 177–183, Germ. summ.) described the warning system in Slovenia. M. Perišić (pp. 91–96, Engl. summ.) described some widespread parasites of fruit trees, vine, and forest trees in Macedonia, listing 20 fungal and virus diseases of economic importance, especially *Microstroma juglandis* on walnut, *Gymnosporangium confusum* on medlar, and a very severe outbreak of an [unspecified] virus infection of quince in the Bitolja district.

Radojica Kljajić (pp. 97–103, Engl. summ.) dealt with some lesser known plant pathogens in Macedonia, studied in the course of 1956–7, many of which are 1st records for the republic. Spp. on medicinal, ornamental, and wild plants are tabulated. Milica Tomašević-Grujoska (pp. 105–108, Germ. summ.) reported on the problem of withering of *Pinus sylvestris*, *P. nigra*, and *P. peuce* in Macedonia caused by *Cenangium abietis*. M. Jordović (pp. 109–111, Engl. summ.) warned nurserymen of the recent appearance in Yugoslavia of tatter leaf [peach ring spot virus] and ring mottle viruses on cherry and apricot ring pox virus on apricot.

F. Janežić (pp. 113–117, Engl. summ.) reported on the distribution of vectors of potato viruses in Slovenia and their importance in 'seed' production. Bintje appeared to be most heavily infested by *Myzodes* [*Myzus*] *persicae*.

M. Josifović (pp. 119–125, Fr. summ.) dealt with the problem of the infectious degeneration virus of vine, which occurs in all vine-growing areas of Yugoslavia. Tatjana Brodnic-Specogna (pp. 127–134, Germ. summ.) reported on a vine degeneration in Tzola region associated with mineral deficiency, particularly of K and B.

M. Kus, Vera Lušin, and M. Panjan (pp. 135–141, Germ. summ.) described the comparative diagnosis of potato leaf roll virus. Resorcinol tests [**39**, 264] on stems and tubers of 10 vars. indicated that the method was about 85% reliable. M. Panjan and Vera Lušin (pp. 143–145, Germ summ.) dealt with the comparative diagnosis of potato virus X [**39**, 33] by the agglutination and precipitation methods; the former proved more rapid, economical, and practical. J. Pobegajlo (pp. 147–154, Engl. summ.) suggested that *Homotoma ficis*, very common in the region, may be the vector of fig mosaic virus in Herzegovina [**38**, 370]. V. Masten (pp. 155–158, Germ. summ.) described a widespread 'dry grape' condition of vines in Slovenia, Croatia, and Istria, caused by *Phoma* sp. Radojica Kljajić (pp. 159–161, Engl. summ.) reported on white rot of grapes (*Coniothyrium* [*Coniella*] *diplodiella*), which represents a serious problem in Serbian viticulture. Mirjana Mirić (pp. 164–168, Engl. summ.), of the Beograd Pl. Prot. Inst., described the field inoculation of maize with *Helminthosporium turcicum* [**36**, 399]; the most resistant vars. were Vukovarski zuban, Novosadski × Vukovarski zuban, and Hy × L–317, followed by Rumski zlatni zuban, A × W–22, and US–13.

Nemanja Ostojić (pp. 169–176, Germ. summ.) dealt with the value of some fungicides for the control of apple scab (*Venturia inaequalis*) [**38**, 527] under various weather conditions; captan, zineb, and wettable S were best. J. Maček (pp. 235–240, Germ. summ.) obtained the best results with 0·25% nirit, 0·2% venturicide, and 0·2% orthocide, the last being particularly effective as a preventive. M. K. Krstić (pp. 185–188, Engl. summ.) dealt with the relation between the number of sporophores of *Ungulina fomentaria* [*Fomes fomentarius*: **35**, 335] and the extent of decay in beech in Juzni Kucaj.

Z. M. Radovanović (pp. 189–195, Engl. summ.) reported on some important diseases of tobacco in Serbia and Macedonia and their control. Pathogens in the field include *Pythium debaryanum*, *Olpidium brassicae*, *Fusarium* sp., *Rhizoctonia* [*Corticium*] *solani*, *Thielavia basicola*, and *Bacterium* [*Pseudomonas*] *tabacum*. 'Basara' and 'green net', both of unknown origin, cause damage during drying. J. Mickovski (pp. 197–204, Engl. summ.) stated that 86–90% control of tobacco mildew (*Erysiphe cichoracearum*) [**38**, 627] and an improvement in quality was obtained in Macedonia with 3–4 sprays of 0·12% karathane at intervals of 12–15 days. In dry years 0·08–0·6% is recommended. K. Minev (pp. 205–211, Engl. summ.) described chemical and agrotechnical measures for control of the disease; 0·2% cosan sprinkled over the leaves and ground was the most effective.

M. Krstić & Stana Hočevar (pp. 213–218, Engl. summ.) dealt with the eradication of chestnut canker (*Endothia parasitica*) [**38**, 103]. Sprouts from the stumps of felled, infected trees are often a source of further infection. A water emulsion of tormon 80 (CELA, Ingelheim, Germany) at 0·5 and 1% destroyed 1- and 2–3-yr.-old sprouts, respectively, and prevented further growth. Tormon 100 was effective at 25 ml./l. diesel oil when 1-yr. sprouts were smeared up to 10 cm. from the base.

B. Jovičević (pp. 219–222, Engl. summ.) states that *Sphaerotheca mali*, a new pathogen on pear in Yugoslavia, has been observed on many vars. at Pec for the last 5 yr. Sitna limunka is the most susceptible, but the fungus attacks only the fruit, while on Blumenbach, Ekšikut, and Tiranka the branches also are infected.

Ana Šarić-Sabadoš (pp. 223–226, Engl. summ.) reported on blue-staining fungi in timber. On pine, fir, basswood [*Tilia*], and locust [*Robinia pseudoacacia*] *Fusicoccum tingens* was the most widespread and destructive; a new [undescribed] sp. of *Ceratostomella* caused slight discoloration of the first 3.

Ivanka Milatović (pp. 227–230, Engl. summ.), studying the biology of cherry leaf spot (*Coccomyces* [*Higginsia*] *hiemalis*) [**37**, 94] in different parts of Croatia, reported that it overwinters as mycelium in twig lesions, conidia produced abundantly in the spring causing primary infections.

T. Dimitrovski (pp. 241–246, Engl. summ.) dealt with apricot apoplexy [**34**, 604] in Macedonia, resulting chiefly from sudden spells of low temp. *Valsa leucostoma* and *Verticillium alboatrum*, isolated from the wilted trees, are probably only secondary.

Koleva-Šekutkovska (Milosija). **Prilog poznavanju parasitne flore N. R. Makedonije.** [A contribution to the knowledge of parasitic flora in the People's Republic of Macedonia.]—*Zasht. Bilja* (*Plant Prot., Beograd*), *1959*, 51, pp. 107–117, 1959. [Engl. summ.]

This review from the Poljoprivredno-šumarski fakultet, Skopje, Yugoslavia, lists 120 spp. of fungi and 9 spp. of bacteria, including *Alternaria brassicae* [map 353] on cabbage; *Claviceps purpurea* [map 10] on rye; *Colletotrichum lagenarium* [map 313] on cucumber; *Helminthosporium sativum* [*Cochliobolus sativus*: map 322] on wheat; *Melampsora allii-populina* on poplar [cf. **38**, 427]; *Melampsorella caryophyllacearum* on *Abies alba* [**34**, 620]; *Microsphaera alphitoides* on oak [**36**, 6]; *Spongospora subterranea* [map 34] on potato; and *Uromyces appendiculatus* [map 290] on bean (*Phaseolus vulgaris*).

Annual Report East African Agriculture and Forestry Research Organization, 1958. (Record of Research for the period 1st January to 31st December, 1958.)—109 pp., 1959. *Sh.* 3/50.

In the section (pp. 48–72) dealing with plant improvement and protection [cf. **38**, 55] L. R. Doughty reviews 21 years' work since 1937 on cassava breeding for resistance to the viruses of mosaic [cf. **36**, 746 *et passim*] and brown streak [cf. **37**, 5 *et passim*]. H. H. Storey and A[udrie] K. Howland report work on the

genetics of resistance in maize to maize streak virus [cf. **38**, 55] and describe breeding studies on maize rust (*Puccinia polysora*) [loc. cit.]. F[RANCES] M. L. SHEFFIELD discusses methods of diagnosing sugarcane ratoon stunting [loc. cit.; **38**, 294], work on which is in progress, and deals with quarantine [cf. **38**, 128]. H. H. STOREY, reporting on the protection from introduced pests and diseases, describes the organization of plant import control [cf. **38**, 729].

Administration Report of the Department of Agriculture, Trinidad and Tobago, for the year 1957.—viii+49 pp., 1959. $ 0.60 B.W.I.

It is reported (pp. 16–18) [cf. **38**, 657] that *Mycosphaerella* and *Septoria* spp. were constantly associated with reddish-brown spots on leaves and fruit of grapefruit [**37**, 203], disfiguring the fruit for market. *Guignardia citricarpa* was also found during the investigations but symptoms of citrus black spot have not previously been recorded in Trinidad. Bark of some dead grapefruit trees in Talparo examined at Univ. Calif. gave indications of the presence of citrus tristeza [virus], but the efficient tristeza vector (*Toxoptera citricidus*) is unknown in Trinidad [cf. **32**, 66].

Low vol. spraying trials on bananas showed that while oils alone gave as good control of *M. musicola* [**37**, 730] as the Cu substances now in use, alone or with oil, actidione was unsatisfactory and phytotoxic, and a wax emulsion required the inclusion of a Cu fungicide. A spray service to banana growers was to be started in 1958.

TOLER (R. W.), CUELLAR (R.), & FERRER (J. B.). **Preliminary survey of plant diseases in the Republic of Panama.**—*Plant Dis. Reptr*, **43**, 11, pp. 1201–1203, 1959.

Lists of the chief pathogens are grouped under hosts, both arranged alphabetically, with notes on the relative economic importance of each disease. Included, *inter alia*, are *Sclerotium rolfsii* [map 311] on various hosts; *Colletotrichum lindemuthianum* [177] on bean; *Phoma lingam* [73] and *Xanthomonas campestris* [136] on cabbage; *Monilia roreri* [13] on cacao; *Pseudoperonospora cubensis* [285] and *C. lagenarium* [313] on cantaloupe and watermelon; *Diaporthe citri* [126] and *Corticium salmonicolor* [122] on *Citrus* spp.; *Pellicularia koleroga* [64], *Mycena citricolor* [9], and *Cercospora coffeicola* [59] on coffee; *Physoderma maydis* [106], *Puccinia sorghi* [379], *Ustilago maydis* [93], *Ustilaginoidea virens* [347], *Helminthosporium turcicum* [257], and *H. maydis* [*Cochliobolus heterostrophus*: 346] on maize; *Peronospora destructor* [76] on onion; *Puccinia arachidis* [160], *Cercospora personata* [*Mycosphaerella berkeleyii*: 152], and *C.* [*M.*] *arachidicola* [166] on groundnut; *C. capsici* [248] and *Phoma destructiva* on *Capsicum frutescens* and *C. annuum*; *Alternaria solani* [89] on potato and tomato; *Cercospora oryzae* [71], *H. oryzae* [*Cochliobolus miyabeanus*: 92], and *Piricularia oryzae* [51] on rice; *Puccinia purpurea* [212] and *Colletotrichum falcatum* [*Glomerella tucumanensis*: 186] on sorghum; *Xanthomonas vasculorum* [3] and strains A, C, and D of sugarcane mosaic virus [299] on sugarcane; *Cladosporium fulvum* [77] on tomato; *C. cucumerinum* [310] on cantaloupe and cucumber; and various pathogens on tobacco [**38**, 162].

HORSFALL (J. G.) & DIMOND (A. E.) (Editors.) **Plant pathology, an advanced treatise. Vol. I. The diseased plant.** xiv+674 pp., 38 fig., 4 graphs, New York and London, Academic Press, 1959. $ 22.

This work is to comprise 3 volumes, together presenting an overall picture of modern plant pathology. Specific diseases and control measures are not described, and are mentioned only in illustration of general principles. Vol. I deals with the scope, importance, and history of plant pathology; pathological processes and defence devices; predisposition; and the therapy of the diseased plant. An introductory section by the editors is followed by contributions from J. G. TEN HOUTEN, 'Scope and contributions of plant pathology'; G. W. KEITT, 'History of plant

pathology'; K. S. Chester, 'How sick is the plant?' A. Husain & A. Kelman, 'Tissue is disintegrated'; A. C. Braun, 'Growth is affected'; A. Ciccarone, 'Reproduction is affected'; S. Sempio, 'The host is starved'; D. Subramanian & L. Saraswathi-Devi, 'Water is deficient'; I. Uritani & T. Akazawa, 'Alteration of the respiratory pattern in infected plants'; S. Aki, 'Histology of defense in plants'; P. J. Allen, 'Physiology and biochemistry of defense'; K. O. Müller, 'Hypersensitivity'; C. E. Yarwood, 'Predisposition'; and F. L. Howard & J. G. Horsfall, 'Therapy'. Each section has several pp. ref.; there are author and subject indexes. The book is to be commended for its breadth of scope and consistently readable style.

Atkins (H. J. B.) (Editor). **Tools of biological research.**—xvi+183 pp., plates and text-fig., Oxford, Blackwell Scientific Publications, 1959. 37*s.* 6*d.*

This volume comprises a series of papers read at a symposium arranged by the Surgical Research Society at Guy's Hospital, London, in Oct. 1958 when the scope and limitations of certain 'tools' commonly employed in surgical research projects were surveyed. Most of these papers are also of interest to workers in other branches of biology. Mention may be made of 'The design of experiments' by P. Armitage (pp. 1–10), 'The electron microscope' by D. Robertson (pp. 72–121, 17 fig.), 'Weighing cells with the microscope (Some aspects of phase contrast and interference microscopy)' by R. Barer (pp. 122–143, 9 fig.), and 'Electrophoresis' by N. H. Martin (pp. 144–153, 6 fig.). All the contributions are well documented.

List of research workers, 1959.—iv+434 pp., Commonwealth Agricultural Bureaux, 1959. 42*s.*

This new edition lists senior research workers engaged in agriculture, animal health, and forestry in the British Commonwealth and Colonial Territories, the British Middle East Development Division, the Republic of the Sudan, and the Republic of Ireland at the end of 1958. Following a decision of the Review Conference of 1955 workers in Extension and Advisory services are no longer included.

Doolittle (S. P.), & Crossan (D. F.). **Strains of Xanthomonas vesicatoria (Doidge) Dowson differing in virulence on Tomato and Pepper.**—*Plant Dis. Reptr.* **43**, 11, p. 1153, 1959.

At Del. agric. Exp. Sta. isolates from lesions on severely infected tomato fruits produced spot lesions on tomato leaves [**39**, 247], but only slight spotting on pepper [*Capsicum* sp.] foliage, attributable to the age and retarded growth of the plants rather than to any specificity of the isolate. The converse was obtained with isolates from capsicum, but this host specificity is apparently not typical of all isolates from tomato and pepper [cf. **3**, 119].

Il'enko-Petrovskaya (Mme T. P.). Микрофлора внутренних тканей Картофельных клубней. [The microflora of the inner tissues of Potato tubers.]—Науч. Труд. Самарканд. Ин-та сов. Торговли [*Nauch. Trud. Samarkand. In-ta sov. Torgovli*], *1957*, 8, pp. 207–209, 1957. [Abs. in *Referat. Zh. Biol.*, *1959*, 18, p. 179, 1959.]

Bacillus mesentericus [cf. **34**, 58] and *Bacterium* [*Bacillus*] *subtilis* were found in otherwise healthy potato tuber sap. *B. mesentericus*, from root tissues of radish and onion bulb, was pathogenic to potato tubers. When there is sufficient humidity, the decomposition of infected tuber tissues resembles the wet rot type.

Ramamurthi (C. S.). **Comparative studies on some Gram-positive phytopathogenic bacteria and their relationship to the Corynebacteria.**—*Mem. Cornell agric. Exp. Sta.* 366, 52 pp., 2 pl. (18 fig.), 1959. [140 ref.]

This information has already been noticed [**37**, 328].

KLINGE (K.). **Pseudomonas fluorescens, ein Boden- und Wasserkeim. I. Physiologie und Identifizierung.** [*P. fluorescens*, a soil and water germ. I. Physiology and identification.]—*Arch. Mikrobiol.*, **33**, 1, pp. 1–24, 4 fig., 1 graph, 1959. [68 ref.]

Studies at the Hygienisch-Bact. Inst., Univ. of Erlangen, Germany, revealed that in contrast to *P. fluorescens*, *P. aeruginosa* possesses only 1 flagellum, grows in liquid medium at 37–42° C., and develops pyocyanin and sometimes weak H_2S; all strains were haemolytic. *P. fluorescens* causes an egg-yolk reaction, and only those strains which develop protostatic-protocidic substances are haemolytic. *P. aeruginosa* and *P. fluorescens*, in contrast to *P. putida*, utilize gelatin.

GORLENKO (M. V.) & CHUMAEVSKAYA (Mme M. A.). О виде и взаимоотношениях некоторых опухолеобразующих фитопатогенных бактерий. [On species and interrelationships of some tumour-forming phytopathogenic bacteria.]—Науч. Докл. высш. Школ. [*Nauch. Dokl. vÿssh. Shkol.*], Biol. Sci., *1959*, 3, pp. 135–136, 1 fig., 1959.

The object of this study at the Moscow Sta., All-Union Inst. of Plant Protection, in 1952–54 was to determine the specialization in the group and the evolution of parasitism. *Pseudomonas rimaefaciens* [**17**, 492], agent of bacterial canker of poplars, easily infected some poplar vars., but many other trees and shrubs, hosts of *P. syringae*, were resistant. It differed from *P. syringae* also in inducing only a local disease of the phloem and part of the wood and in its mode of penetration (only through wounds). It differed also serologically. These differences support the concept of 2 separate spp. The agent of oleander knot, *P. tonelliana* [**36**, 247], is specialized on oleanders and differs in biochemical properties from *P. savastanoi* on olive and *P. fraxini* on ash and should also be taken as a distinct sp. On a serological basis *P. rimaefaciens* is closer to *P. tonelliana* than to *Bacterium* [*Agrobacterium*] *tumefaciens*, and the latter was closer than *P. rimaefaciens* to *P. syringae*. *P. tonelliana* had nothing in common with *P. syringae*. The tumour-forming bacteria are more closely related to one another than to *P. syringae* or *P. citriputeale* [*P. syringae*]; these two show a remarkable similarity in antigen structure. *P. savastanoi*, *P. tonelliana*, and *P. rimaefaciens* probably have a common ancestor, close to the fluorescing spp. *A. tumefaciens* clearly originated from soil spp. of the genus *Rhizobium*. The evolution of this group goes further in the direction of symbiotic relationships. The tumour-forming bacteria cannot all be united in *Agrobacterium*, since they are of different origin. This genus should be abandoned and its spp. distributed among other genera, compatible with their origin. The causal agent of beet gall, for example, is rightly designated *Xanthomonas beticola* by Bergey *et al.*

LIPETZ (J.). **A possible role of indoleacetic acid oxidase in crown gall tumour induction.**—*Nature, Lond.*, **184**, 4692, pp. 1076–1077, 1959.

Further studies [**38**, 661] at Dept Bot., Yale Univ., New Haven, Conn., suggest that the extra indole-3-acetic acid necessary for the development of tumour cells may be due not to an avirulent strain of *Agrobacterium tumefaciens*, but to a diminished destruction of auxin in the tissues affected by virulent bacteria.

NAG RAJ (T. R.) & GEORGE (K. V.). **An interesting entomogenous fungus on green bug of Coffee.**—*Curr. Sci.*, **28**, 11, pp. 452–453, 1 fig., 1959.

At the Coffee Res. Sta., Balehonnur, S. India, the green bug (*Coccus viridis*) on coffee bushes was parasitized by *Hypocrella olivacea* [cf. **14**, 428].

CIFERRI (R.). **La campagna anticrittogamica del 1958.** [The disease-control campaign of 1958.]—*Notiz. Malatt. Piante* 49–50 (N.S. 28 29), pp. 101–105, 1959. [Engl. summ.]

This review further confirms the value of zineb [**39**, 84] against vine downy mildew

[*Plasmopara viticola*: see below] in Italy, the final treatment being made with a Cu derivative. Against apple scab [*Venturia inaequalis*] zineb and ziram at not less than 300 g./hl. were both effective; zineb caused no injury. Complete control of apple powdery mildew [*Podosphaera leucotricha*] was given by karathane (100 g.). Karathane (50 g.) + 300 g. zineb may conveniently be used against scab and powdery mildew. Zineb was at least as effective as Cu against *Cycloconium* [*oleaginum*: **39**, 264] on olive. Against *Septoria* [*lycopersici*], widespread and injurious, Cu salts were best, and in years such as 1958 should supplement zineb + ziram. Against diseases of flowering and horticultural plants zineb has almost entirely replaced Cu in Italy.

Grandi (L.) & Ciferri (R.). **Saggio biologico e chimico sull' effetto del dilavamento in acqua corrente dello zineb.** [A biological and chemical examination of the effect of exposing zineb to running water.]—*Notiz. Malatt. Piante* 49–50 (N.S. 28–29), pp. 205–214, 1959. [Engl. summ.]

After a consignment of a commercial zineb product which had been accidentally immersed in water was dried, its fungicidal activity was enhanced; an experiment was therefore conducted in which a sack containing commercial zineb (A) with 65% active ingredient and another with (B), 80% active, were placed in glass cylinders in a continuous current of water from the base upwards. Samples were assayed daily for 15 days by spore germination of *Stemphylium sarciniforme* [**39**, 154]. The zineb content, biological activity, and loss of wt. were correlated, compared with unwashed material, for the 1st 6–7 days. Fungicidal activity had increased by 36% (product A) and 56% (B) by the 6th day and by 93% and 72%, respectively, by the 15th. The zineb content was 21% (A) and 8% (B) higher than in the controls on the 6th day and 24% and 9% higher, respectively, on the 15th. The loss in wt. was 44% (A) and 19% (B) on the 6th day and 48% and 21%, respectively, on the 15th.

Großmann (F.). **Untersuchungen über die innertherapeutische Wirkung organischer Fungizide. III. Chinolin-Derivate und Captan.** [Studies on the internal therapeutic action of organic fungicides. III. Quinoline derivatives and captan.]—*Z. PflKrankh.*, **66**, 7, pp. 385–391, 1959. [Engl. summ. 35 ref.]

In this final study [**38**, 446] the effects of 8-oxyquinoline and quinosol against *F. oxysporum* f. [*F. bulbigenum* var.] *lycopersici* and *Alternaria solani* on tomato plants grown in sand were so variable as to be without statistical significance, while against *Phytophthora infestans* there was no action. Captan was ineffective against all 3. In no case was the sap exuding from cut shoots fungitoxic [cf. **37**, 450].

Wallen (V. R.) & Hoffman (I.). **Fungistatic activity of captan in Pea seedlings after treatment of the seeds or roots of seedlings.**—*Phytopathology*, **49**, 10, pp. 680–683, 1 fig., 1 graph, 1959.

At the Canada Dept Agric., Ottawa, bioassay on agar with *Saccharomyces pastorianus* demonstrated a fungistatic substance in pea seedlings grown from seed treated with 75% captan; these were somewhat less susceptible to *Ascochyta pisi* [**37**, 432] than seedlings from untreated seed. Analysis showed a max. of 0·25 p.p.m. captan in the above-ground parts of such seedlings, an amount insufficient to have reduced infection; the result was therefore attributed to possible undetected breakdown products [cf. **37**, 574]. The treated seed carried an av. of 280 μg. captan/seed before planting, reduced to 7 μg. at emergence, and < 0·1 μg. was still recoverable after 9 weeks. Captan applied in Hoagland's solution to the roots of pea seedlings was later found in the above-ground parts; dissolving it in acetone before adding to the solution resulted in greater accumulation and improved protection against *A. pisi*.

Toth (L. Z. J.). **The sterilizing effect of ethylene oxide vapour on different micro-organisms.**—*Arch. Mikrobiol.*, **32**, 4, pp. 409–410, 1 graph, 1959. [Germ. summ.]

In tests at the Eye and Ear Infirmary, Mass., conc. and time required for sterilization of agar cultures at 30% R.H. and 22° C. were inversely related [cf. **35**, 470]. The spore-forming bacilli were the most resistant, tolerating concs. twice as high as the non-spore formers. The lethal conc. for *Rhodotorula* sp., *Pullularia pullulans*, and *Penicillium* and *Aspergillus* spp. was low.

Maruzzella (J. C.), Balter (J.), & Katz (A.). **Further studies on the action of perfume oil vapours on micro-organisms.**—*Perfum. essent. Oil Rec.*, **50**, 12, pp. 955–957, 1959.

Of 100 perfume oil vapours [cf. below] tested against 8 bacteria *in vitro* at the Biology Dept. Long Island Univ., Brooklyn, N.Y., almond S, bluestone bouquet, cinnamon, compounded fruit odor No. 1285, and neutralizer F. A. inhibited *Erwinia carotovora* [**38**, 185], inducing inhibition zones 23–45 mm. diam., but all had low killing power.

Maruzzella (J. C.) & Balter (J.). **The action of essential oils on phytopathogenic fungi.**—*Plant Dis. Reptr*, **43**, 11, pp. 1143–1147, 1959. [13 ref.]

By the filter paper disk method [cf. **38**, 185] 51 of 119 oils [cf. above] showed a wide spectrum of activity against 12 phytopathogenic fungi, while 100 were antibiotic on at least 2 of the 12. Zones of inhibition were considerable, e.g. with oil of onion, garlic, and *Cymbopogon citratus*. The most vulnerable fungus was *Claviceps purpurea* (killed by 80% of the oils), and *Alternaria tenuis* the least (58%). The possibilities of application *in vivo* remain to be investigated, particularly in respect of toxicity to human and animal tissues. The addition of such oils to fungicidal sprays might enhance their effectiveness [cf. **37**, 640].

Domsch (K. H.). **Die Prüfung von Bodenfungiciden. I. Pilz-Substrat-Fungicid-Kombinationen. II. Pilz-Boden-Wirt-Fungicid-Kombinationen.** [The testing of soil fungicides. I. Fungus–substrate–fungicide combinations. II. Fungus–soil–host–fungicide combinations.]—*Plant & Soil*, **10**, 2, pp. 114–131, 1 graph; pp. 132–146, 1 pl., 1 fig., 2 graphs, 1958. [Engl. summ.]

Preliminary experiments at the Institut für Getreide-, Ölfrucht-, und Futterpflanzenkrankheiten, Kiel-Kitzeberg, Germany [**38**, 455], indicated that fungus spores are more sensitive to fungicides than mycelium, and that, within certain limits, the age of the mycelium does not substantially influence its sensitivity. When 51% K 8-quinoline sulphate, 50% captan, and 80% thiram were tested against *Pythium* sp., *Rhizoctonia* [*Corticium*] *solani*, and *Fusarium culmorum* by 6 different assay procedures results for a given fungus with a given fungicide were found to differ as much as 100-fold. The frequency of 'broken' dose-effect curves makes it essential to test over a wide range of conc., advisably with several test fungi. It was established that the fungicides studied, applied under cultural conditions at the usual dosages, did not exert a direct lethal action on the mycelium in the soil. Assay methods which permit measurement of partial inhibition of mycelium are of increasing importance.

In the technique described in the 2nd paper a soil-compost mixture was placed in shallow clay trays, the fungicide worked in or applied by drenching, and the test fungus introduced by watering with a mycelial suspension on the same day. Alderman peas were sown and covered and the trays kept for 6 days at 8° C., and then for 6 days in the dark at 25° (for *Pythium* sp.) or 20° (for *C. solani*). Captan, pentachloronitrobenzene, and an organic mercurial gave results reproducible to an

exceptional degree. Captan gave highly successful control of both fungi at conc. (100–200 p.p.m.) well below the fungitoxic limit.

KLOTZ (L. J.), DEWOLFE (T. A.), & BAINES (R. C.). **Laboratory method for testing effectiveness of soil disinfestants.** —*Plant Dis. Reptr*, **43**, 11, pp. 1174–1175, 2 fig., 1959.

At Univ. Calif. Exp. Sta., Riverside, vertical lucite cylinders of soil 42 in. by 4 in. diam., with slots cut at 3 different levels 12 in. apart, contained citrus seedlings whose roots had been dipped in a zoospore suspension of *Phytophthora parasitica*, the tops protruding from the slots. After 10 days to allow for infection to invade the roots thoroughly the tops of the seedlings were cut off and the slots sealed. Powdered disinfestant at 400 lb./acre was mixed with the surface in. of soil in one of the cylinders and covered by water to the depth of 6 in.; a liquid disinfestant at the same dosage, was set in a 30-ml. beaker on the soil surface of another cylinder and water to provide a depth of 6 in. added and allowed to overflow onto the soil. The control had water only. After 2 weeks the seedling roots and the soil at the 3 levels were assayed for recovery of the fungus by the apple and lemon technique [**37**, 660]. The powder killed the fungus down to 30 in. and the liquid to 18 in.

GRAINGER (J.). **Disease control through intimate mixing of mercuric oxide with soil.**—*Phytopathology*, **49**, 10, pp. 627–633, 3 fig., 1 graph, 1959.

A machine is described from the W. Scot. agric. Coll., Auchincruive, Ayr, which can deliver 13 cu. ft./acre dust containing 5 lb. Hg as yellow HgO and incorporate it evenly in the top 9 in. of soil (*Res. Bull. W. Scot. Coll. Agric.* 25, pp. 1–46, 1958). Good disease control was obtained at half this rate. The dust is delivered at the surface and at 7 in. deep and incorporated with a horizontal rotary cultivator working to 9 in. depth, in front of which the dust is evenly delivered by suitable surface deflectors. To ensure application in depth the dust is blown into the spaces behind a series of duck-foot tines. Soil distribution was checked by use of radioactive I (I^{131}) in place of Hg.

Though primarily designed for use against potato eelworm, good control was also obtained of soil-borne *Erwinia atroseptica* [**37**, 262], *Spongospora* [*subterranea*: **31**, 625], and *Rhizoctonia* [*Corticium solani*] and *Colletotrichum* [*atramentarium*], both common concomitants of eelworm attack. On ground heavily infested by *Plasmodiophora brassicae* infection of turnips was reduced by 96% and yield increased by up to 9 tons/acre. The effect of treatment apparently persists well into the growth cycle, but is almost exhausted by the end of the crop. Potato yields were severely reduced by treatment 12 hr. before planting, but substantially increased if an interval of 6 days was left.

WORTHINGTON (E. B.). **Biological problems arising from the control of pests and diseases.**—*Nature, Lond.*, **184**, 4693, pp. 1100–1102, 1959.

These problems were discussed at a symposium arranged in London by the Inst. Biology, Oct. 1959. Among other aspects of biology F. C. BAWDEN drew attention to agricultural problems arising from the control of pathogens, and J. T. MARTIN dealt with the danger to man from pesticides and fungicides, the responsibility for which in Britain lies almost entirely with the manufacturer and the farmer, there being no legal tolerances except for As. F. G. H. LUPTON spoke on wheat breeding and the evolution of new rust races.

WOLFENBARGER (D. O.). **Dispersion of small organisms. Incidence of viruses and pollen; dispersion of fungus spores and insects.**—*Lloydia*, **22**, 1, pp. 1–106, 194 graphs, 1959. [205 ref.]

In this further paper [cf. **25**, 404] the author continues his descriptions of

dispersion or incidence as affected by distance in quantitative and objective terms. Part 1 (pp. 3–67), covering horizontal and vertical dispersion, discusses a series of graphs showing the distances to which organisms disperse or are dispersed or the distances to which incidences of disease, infestations, occurrences, or injuries have been determined. By means of these graphs, interpolations may be made, consideration given to variations in observed and curve values, and extrapolations are rendered possible.

Horizontal dispersion is dealt with under 'inanimate objects', 'unknown' or virus, and the plant and animal kingdoms. Part 2 (pp. 67–89) deals with 'generalizations', including the achievements of dispersion, its sampling or measurement, and the factors associated with distances of dispersal. The regression formulae used to determine the calculated or curve values are given in an appendix (pp. 90–95). Most of the papers on viruses and other plant diseases and spore dispersal, referred to by the author in developing his theories, have been noticed in this *Review*.

Zadoks (J. C.). **On the formation of physiological races in plant parasites.**—*Euphytica*, **8**, 2, pp. 104–116, 1959. [Dutch summ.]

Following a general article on various aspects of physiologic races of fungi in relation to plant breeding for resistance to disease, the author concludes that for the European wheat breeder the multiline vars. offer the greatest promise. The genetics of the host–parasite relationship are, he considers, explicable in terms of the gene for gene hypothesis of Flor [cf. **37**, 284, 663].

Pandila (M. M.) & Pande (G. C.). **Effect of fungal decay on the yield of pulp from bagasse.**—*Indian Pulp Pap.*, **14**, 1, pp. 55–56, 1959.

Baled bagasse, stored in the open, often becomes blackened and mouldy. At the Central Res. Lab., Rohtas Industries Ltd., *Mucor mucedo*, *Aspergillus* sp., and *Penicillium* sp. were isolated on Sabouraud's maltose agar from such bales. The pulp yield was 2·7% less than that from comparable non-mouldy bales and the pulp was darker.

Microorganisms in relation to organic coatings.—*Off. Dig. Paint Varn. Prod. Cl.*, *1958*, 396–401, pp. 364–430, 8 fig., 1958.

This is a symposium of 7 papers presented at a meeting of the Louisville (Ky) Paint and Varnish Production Club on 4 Mar. 1957. M. Goll (Micro-organisms and test procedures in the assay of preservatives and mildew inhibitors, pp. 364–367) of the Troy Chemical Co., Newark, N.J., describes the agar plate test for the assay of preservatives against moulds on paint films.

Fungi isolated by F. M. Rothwell (Isolation and identification of microflora on exterior oil paints, pp. 368–376) at the Buckman Laboratories, Inc., Memphis, Tenn., from oil paint films exposed on test fences [see below] at 6 locations in U.S.A. included *Alternaria dianthicola*, *Aspergillus flavus*, *Botryodiplodia malorum*, *Botrytis cinerea*, *Cladosporium sphaerospermum*, *Fusarium flocciferum*, *Helminthosporium spiciferum*, *Paecilomyces varioti*, *Penicillium oxalicum*, *Phoma glomerata*, *Pullularia pullulans*, and *Stemphylium consortiale*.

At the Buckman Laboratories R. T. Ross (Attack of linseed oil and linseed oil films by micro-organisms, pp. 377–391) found that these oils, with small amounts of soil, served as a complete nutrient medium for *P. pullulans*, *Alternaria* sp., and *C.* sp. Attack by any single sp. decomposed the oil to free glycerin and fatty acids, which were oxidized to glyceraldehyde and epihydrinaldehyde. These chemical changes were accompanied by a decrease in viscosity and an increase in water-solubility of the oil.

E. E. Wiese (Can and film preservation, pp. 392–397), of the Dow Chemical

Co., Midland (Mich.), summarizes essential information on the use of preservatives in emulsions, especially latex paints, for shelf and film stability. A 3-point programme is envisaged for the prevention of microbial deterioration, namely, thorough plant sanitation, can preservation, and film protection.

G. Eisenschiml (Preservatives in industrial maintenance coatings, pp. 398–407) of the Scientific Oil Compounding Co., Inc., Chicago, discusses the relative merits for the purpose indicated of the phenyl mercurials and Cu-8-quinolinolate, using as a basis the 7 requirements of Herman and Reed (*Fd Engng*, Feb. 1952), viz. (1) toxic to micro-organisms but not to man or domestic animals, (2) odourless and tasteless, (3) colourless at use levels, (4) thermostable, (5) harmless to the coating, (6) competitive in cost, and (7) highly resistant to leaching and weathering. As regards (1) the toxicity of the phenyl mercurials is debatable, whereas the safety of Cu-8-quinolinolate is well established; for (2) the rating is equal; and with (3), (5), and (6) the advantage lies with the phenyl mercurials but for (4) and (7) with Cu-8-quinolinolate.

At the Nuodex Products Co., Elizabeth, N.J., P. F. Klens and C. F. Koda (Self-sanitizing paint surfaces, pp. 408–413) used 3 fungi, including *Aspergillus niger*, in tests for the evaluation of the 'cidal' action in self-sterilizing films. The test organism is placed on the surface, incubated for various periods at R.H. 33–98%, and attempts are made at recovery.

In Part I of his paper (The evaluation of fungicides for use in paints, pp. 414–430) S. Shapiro, U.S. Army Engineer Res. and Development Lab., Fort Belvoir, Va, summarizes the test method of Vicklund and Manowitz [cf. **34**, 47], while Part II is a report on the field evaluation in the Panama Canal Zone and Texas of compounds that had exhibited superior fungicidal activity in laboratory experiments [**37**, 758].

Plant quarantine announcements.—*F.A.O. Pl. Prot. Bull.*, **7**, 9, pp. 125–126, 1959.

A list of plant pests and diseases considered to be dangerous, drawn up to implement the Plant Import Ordinance of 5 Aug. 1954 [**34**, 705] by the Director of the Federal Inst. for Plant Protection, Austria, is presented.

List of intercepted plant pests, 1958.—[*S.R.A. Bur. Ent. Wash.*], 85 pp., 1959.

Interceptions [cf. **37**, 759] included *Xanthomonas citri* [map 11] and *Phoma* [*Guignardia*] *citricarpa* [53] on citrus, both from Singapore and the former also from Hong Kong and the latter from Thailand, *Tilletia contraversa* [297] on rye seed from Afghanistan, and camellia yellow spot [yellow mottle leaf] virus on camellia leaves [cf. **35**, 458] from the Netherlands.

Robertson (N. F.). **Experimental control of hyphal branching and branch form in hyphomycetous fungi.** –*J. Linn. Soc.* (*Bot.*), **56**, 366, pp. 207–211, 3 fig., 1959.

The fact that the genetic control of the shape of the conidiophore is closely linked to the environmental conditions prompted these experiments at the Bot. Sch., Univ. Cambridge. Transfer of hyphae of *Fusarium oxysporum* [cf. **38**, 351] after 10 sec. in water to an isotonic solution led to an arrestment of extension and subsequent swelling and branching. Immersion for 40 sec. or less before transfer caused all apices to swell and branch, whereas longer immersion before transfer led to branching in about 50% of apices, with the remaining 50% growing on from the apex of the slight swelling, as occurs in water alone. It is suggested that when the hyphae are growing normally the rate of extension is matched by the rate of wall formation or by irreversible changes in the primary wall some distance behind the apex, and the growing apex is still undifferentiated. In water some hyphae rapidly reach equilibrium and grow on again within 40 sec., but in others, which require more than 40 sec. to reach equilibrium, wall formation or primary wall

change continues into the undifferentiated region, and the whole apex becomes covered by a 'set' wall which no longer permits growth once equilibrium is achieved. The general interest of this phenomenon is discussed.

Marsh (P. B.), Taylor (E. E.), & Bassler (Loretta M.). **A guide to the literature on certain effects of light on fungi : reproduction, morphology, pigmentation, and phototropic phenomena.**—*Plant Dis. Reptr, Suppl.* 261, pp. 251-312, 1959. [17 pp. ref.]

In this useful survey brief information is arranged under the fungus names, listed alphabetically within each of the 4 main taxonomic categories. Lethal and mutagenic effects *in vivo* have been omitted.

Vasudeva (R. S.), Bajaj (B. S.), Chatrath (M. S.), & Ganju (P. J.). **Stimulating effect of ionizing radiations on certain microorganisms.** *Indian Phytopath.*, **12**, 1, pp. 19–24, 1959.

Investigations at the Indian agric. Res. Inst., New Delhi, revealed a marked acceleration of germination and growth of conidia of *Colletotrichum falcatum* [*Glomerella tucumanensis*] when irradiated with fast neutrons at a flux of $0{\cdot}35 \times 10^7$ ns. sq. cm. sec. for 10 min. Higher dosages suppressed germination considerably. Stimulation was also noted when spores were irradiated with 30 r of gamma rays and 12,000 r of X-rays. The growth of a mycelial suspension of *Ustilago nuda* treated with fast neutrons was increased.

Masago (H.). **Studies on the effects of radiation on microorganisms. 2. On the relative sensitivity to ultraviolet light of several microorganisms, as determined by fluorescent photometer. 3. Influence of ultraviolet light on conidial germination of Cochliobolus miyabeanus (Part 1).** *Ann. phytopath. Soc. Japan*, **24**, 2, pp. 97–103, 1 diag., 5 graphs; pp. 104–108, 3 graphs, 1959. [Jap. Abs. from Engl. summ.]

Studies at the Coll. Agric., Kyoto Univ., showed that the sensitivity of microorganisms to UV light decreased as follows: *Staphylococcus aureus* > *Serratia marcescens* > *Escherichia coli* > *Xanthomonas pruni* > *Sarcina* sp. > *Botrytis cinerea*. Short irradiation with high light intensity was more effective than long exposure to low.

The lethal effect of the sun lamp on conidia of *C. miyabeanus* was inferior to that of a germicidal lamp, the former lacking the sterilization wave-length, 2537 A. For an as yet unknown reason the sensitivity of conidia to UV light suddenly increased when they were suspended in water. Different isolates of *C. miyabeanus* differed in their sensitivity to UV light.

Zentmyer (G. A.) & Marshall (Lee Ann). **Factors affecting sporangial production by Phytophthora cinnamomi.** Abs. in *Phytopathology*, **49**, 9, p. 556, 1959.

In a modification of Mehrlich's soil extract method [**14**, 604] abundant sporangia were produced in 48 hr. at 24° C. (opt.) when disks from an agar culture were placed in non-sterile extract, but not in autoclaved or filtered (Berkefeld or Seitz) extract. Diluting to 1/1,000,000 reduced the number of sporangia by about 80%. Reduction of pH from 7·4 to 4·5 had no effect. There was no production below 12° or above 30°; fewer developed in continuous light than in darkness or alternating conditions. Production was best from mycelium on potato dextrose agar (fresh potatoes) and V8 agar [cf. **39**, 155]; dehydrated PDA was less favourable and maize meal gave none. Addition of 25, 5, and 1 p.p.m. Cu to the soil extract prevented sporangial formation, but 0·2 p.p.m. Cu caused no reduction.

Christie (T.). **Nutritional studies of Phytophthora cactorum (Leb. and Cohn.) Schroet. Part 2 : Influence of pH of a culture medium on utilization of some nitrogen and carbon compounds.**—*N.Z.J. Sci.*, **2**, 3, pp. 320–322, 1959.

These results of further studies [cf. **37**, 453], at the Cawthron Inst., Nelson, have already been noticed [**38**, 655].

Rosemberg (J. A.). **Modificazioni morfologiche e fisiologiche in alcuni funghi in dipendenza della nutrizione azotata.** [Morphological and physiological modifications in certain fungi induced by nitrogen nutrition.] –*Atti Ist. bot. Univ. Pavia*, Ser. 5, **16**, pp. 76–84, 1 pl., 1959. [Port. summ. 13 ref.]

In this study [cf. **35**, 213; **36**, 417] 28 fungi were grown in Czapek-Dox liquid with either $NaNO_3$ or amino N (arginine or leucine). Amino N frequently induced marked morphological changes, leucine having an inhibiting effect on fructification and arginine stimulating pigment production.

McAnelly (C. W.). **Free amino acids in the culture media of cells of Fusarium solani f. phaseoli.**—*Phytopathology*, **49**, 11, pp. 734–737, 1959.

At the Agronomy Dept, Univ. Wyo., Laramie, 11 free amino acids were identified chromatographically in 20 isolates of the pathogen [**38**, 641]. The cell contents of glutamic acid, glycine, and alanine in 4 weakly pathogenic strs. were greater (1% significance) than those of 4 stronger parasites; aspartic acid did not differ significantly. The free amino acid contents of the culture media of strs. of different pathogenicity varied, with no particular trend. The amino acid content of healthy and infected beans [*Phaseolus vulgaris*] is to be the subject of further study.

Misra (A. P.) & Mahmood (M.). **Effect of trace elements on growth and sporulation of Colletotrichum capsici (Syd.) Butler & Bisby.**—*Sci. & Cult.*, **25**, 3, pp. 210–211, 1959.

In tests at Bihar agric. Coll., Sabour (Bhagalpur), India, Fe, Zn, Mn, and Cu induced abundant sporulation of *C. capsici* from capsicum plants, which was practically nil without them, and also caused a colour change in the liquid medium from reddish brown to yellowish.

Gupta (S. C.) & Pandey (D. K.). **Studies in pectic enzymes of parasitic fungi. II. Factors affecting the production of protopectinase enzyme by Rhizopus stolonifer (Ehrenb. ex Fr.) Lind.**—*Proc. Indian Acad. Sci.*, Sect. B., **50**, 2, pp. 75–81, 1 graph, 1959.

In further studies [cf. **37**, 452] of *R. stolonifer*, an agent of plum rot [**38**, 268], protopectinase production was unsatisfactory on decoctions of various fruits, potato, carrot, and lucerne seed. When 7 kinds of fruit were inoculated with the fungus all were susceptible to varying degrees, and protopectinase was demonstrable in expressed sap from the rotting tissues. Pectin-asparagine medium, without $CaCO_3$, was satisfactory for enzyme secretion when cultures were incubated at 25° C. for 2–3 days.

Talieva (Mme M. N.). Влияние факторов роста (бактериальных витаминов) на развитие видов **Botrytis** в связи с их специализацией. [The effect of growth factors (bacterial vitamins) on the development of *Botrytis* species in connexion with their specialization.]—*C. R. Acad. Sci. U.R.S.S.*, **121**, 4, pp. 746–749, 1958.

In further work at the Central Bot. Garden, Moscow [cf. **37**, 645], thiamine, inositol, nicotinic, and folic acids (and their complexes with β-alanine) were tested on *B. allii*, *B. anthophila*, *B. tulipae*, *B. cinerea*, and on their antagonists *Trichothecium roseum* and *Aspergillus versicolor* in a glucose asparagine medium. *B. allii* and *B.*

anthophila, the most highly specialized, responded sharply to the autolysates from host plant tissues, their synthetic productivity coefficient being increased twofold, but hardly reacted to the synthetic vitamins. *B. cinerea* reacted weakly to autolysate and vitamins, inositol having the max. effect. It was very close to *T. roseum* and *A. versicolor* in its response to the auxiliary nutrient substance. The addition to the medium of these 2 fungi clearly depresses the development of *Botrytis* spp. *B. tulipae* is intermediate between the two groups in its requirements of auxiliary nutrient substances. It gave a strong response to the autolysate and to the bacterial vitamins. Folic acid was strongly stimulatory.

Dulaney (E. L.) & Stapley (E. O.). **Studies on the transformation of 11-deoxy-17α-hydryoxycorticosterone to hydrocortisone with a strain of Curvularia lunata.**—*Appl. Microbiol.*, **7**, 5, pp. 276–284, 3 graphs, 1959.

At the Merck, Sharp, & Dohme Res. Labs., Rahway, N.J., *C. lunata*, isolated from soil collected in El Salvador, transformed 11-deoxy-17α-hydroxycorticosterone to hydrocortisone. Auxotrophic mutants were easily obtained though the spores are multicellular. The steroid transformation yield could be affected by mutation but not by variations in the medium.

Behal (F. J.) & Eakin (R. E.). **Inhibition of mold development by purine and pyrimidine analogs. Metabolic changes accompanying the inhibition of spore formation in Aspergillus niger.**—*Arch. Biochem.*, **82**, 2, pp. 439–447, 1 graph; pp. 448–454, 1959.

At the Clayton Foundation biochem. Inst. and the Dept Chem., Univ. Texas, Austin, a large range of substituted purines and pyrimidines was tested on *Aspergillus niger*. Three, 6-hydroxy-2-mercaptopurine, an inhibitor of stalk development, 6-ethylthiopurine, an inhibitor of spore formation, and 6-hydroxy-2-mercapto-8-azapurine, an inhibitor of spore pigmentation, were examined in detail with respect to the period of development during which they are active, and the effect of specific counteractants on them.

Exposure of *A. niger* to 6-ethylthiopurine interfered with an aspect of methionine metabolism, apparently concerned in processes critical for sporulation.

Lyr (H.) & Ziegler (H.). **Die Wirkung von Pentachlorphenol auf den Stoffwechsel höherer Pilze.** [The action of pentachlorphenol (PCP) on the metabolism of higher fungi.]—*Phytopath. Z.*, **36**, 2, pp. 146–162, 10 graphs, 1959. [Engl. summ. 38 ref.]

At the Inst. für Forstbotanik, Eberswalde, Germany, *Collybia velutipes* proved most sensitive of 4 fungi to PCP, possibly because of its very intensive P metabolism. The toxic action, apparently the same for *C. velutipes*, *Phellinus* [*Fomes*] *igniarius*, *F. marginatus* (*F. pinicola*), and *Trametes* [*Polystictus*] *versicolor*, was expressed in a characteristic alteration of the individual phosphate fractions leading to a secretion of P, a reduction of the dry matter of the mycelium combined with secretion of N, and an inhibition of sugar resorption. From this it is concluded that PCP acts within certain conc. limits as a specific inhibitor of oxidative phosphorylation. Autolytic changes in *C. velutipes* are very similar in the phosphate fractions, and are clearly observable before any loss in dry wt. can be detected. In both PCP action and autolysis, laccase synthesis is induced, while peroxidase synthesis is inhibited. It is assumed that laccase synthesis is only indirectly connected with these processes but that the latter are indispensable for certain enzyme syntheses in *C. velutipes*.

Yoshii (H.), Asada (Y.), Kiso (A.), & Tanabe (N.). **Studies on the drug resistance in plant pathogenic fungi against agricultural chemicals. (1) On the drug**

resistance of the blast fungus, Piricularia oryzae, against phenyl mercuric acetate.—*Ann. phytopath. Soc. Japan*, **23**, 5, pp. 215 218, 2 fig., 2 graphs, 1958. [Jap. Abs. from Engl. summ. Received Nov. 1959.]

In studies at Coll. Agric., Ehime Univ., Matsuyama, *P. oryzae*, cultured for 40 stages of 20 days each, on a medium containing phenyl mercury acetate (PMA) [cf. **37**, 55; **38**, 181] acquired resistance to it which was not lost after transference for 5 stages of 10 days to a medium without PMA. The fungus was also resistant to $HgCl_2$ and phenyl mercuric dinaphthyl methane disulphonate, but not to methoxyethyl $HgCl_2$ or ethyl mercuric phosphate.

Goodman (R. N.). **Observations on the production, physiological activity and chemical nature of colletotin, a toxin from Colletotrichum fuscum Laub.**—*Phytopath. Z.*, **37**, 2, pp. 187–194, 1 fig., 2 graphs, 1959. [Germ. summ.]

In culture at the Swiss Federal Inst. Technol., Zürich, 3 strains of *C. fuscum* from *Digitalis lanata* and *D. purpurea* [**37**, 26] produced a toxin (colletotin), which induced spots on tomato leaves at 30μg./ml. *Digitalis* foliage lost turgor, with production of a marginal wilt, the chlorophyll paling in response after 6 days at 17μg. ml. These symptoms were similar to those elicited by the fungus on the host. Colletotin consists of a polysaccharide and peptide fraction, the integrity of the former being essential for the retention of toxic activity. Other properties are given.

Opel (H.). **Beiträge zur Analyse der Wachstumsförderungen bei Einwirkung von Hemmstoffen auf Mikroorganismen im Diffusionstest.** [Contributions to the analysis of growth promotion through the influence of inhibitory substances on micro-organisms in the diffusion test.]—*Arch. Mikrobiol.*, **33**, 1, pp. 25–45, 9 fig., 1 graph, 1959.

Several factors were found at the Biol. Zentralanst. der Deutschen Akademie der Landwirtschaftswissenschaften, Berlin, to be involved in the promotion of the growth of micro-organisms at the margin of the inhibitory zones in the diffusion plate method for testing antibiotics. For promotions which can be demonstrated at the margin of inhibitory zones not subject to the influence of inhibitory substances the concept 'margin growth effect' was coined to differentiate from the concentration effect of the inhibitory substances and thus differentiating between a margin growth effect requiring a nutrient (margin growth effect 1) and a 2nd effect which arises from the fact that autotoxic inhibitory substances disappear by diffusion from the margin area and the test organism suffers less from the autotoxic effect there than in its main growth area. When *Bacillus subtilis* was used as the test organism a margin growth effect of the 2nd type was observed on trypsin-peptone agar plates to a degree of 52% increase in growth, but there was none apparent with *Colletotrichum atramentarium*.

Novotel'nov (N. V.) & Ezhov (I. S.). Новый антибиотик, гордецин, выделенный из Ячменного зерна. [A new antibiotic, hordecin, isolated from Barley grain.] —Науч. Докл. высш. Школ. [*Nauch. Dokl. vÿssh. Shkol.*], Biol. Sci. *1959*, pp. 178–182, 5 fig., 1959.

At the Inst. Biochem. Microbiol., Leningrad, hordecin was extracted from a by-product of the brewing industry. A volatile fraction of the antibiotic in ethyl alcohol was antibacterial and inhibitory to *Aspergillus niger* and *Penicillium glaucum*, inducing hyphal distortion and preventing formation of normal fructifications. Inhibition zones varied from 3 to 5 mm.

Tape (N. W.). **A study of the properties and mode of action of nystatin in relation to plant disease control, and of the chemical assay of streptomycin in plant tissue.**—*Diss. Abstr.*, **20**, 1, pp. 22–23, 1959.

At Rutgers Univ., New Brunswick, N.J., nystatin [mycostatin] was found to be

almost completely inactivated in solutions of macerated leaves of tobacco, tomato, or geranium [*Pelargonium*] in 48 hr. at room temp., and also in soil. It becomes strongly bound to the clay minerals to form an inactive complex. The most suitable solvent for nystatin is 2% $CaCl_2$ in methanol, which is only slightly phytotoxic even at high conc. Nystatin did not protect cucumber or pea seed from pre-emergence damping-off.

Fedorinchik (N. S.). Эффективность биопрепарата триходермин-3. [The effectiveness of the biopreparation trichodermin-3.]—Защ. Раст., Москва [*Zashch. Rast., Moskva*], **4**, 5, pp. 32–33, 1959.

In field experiments at the Pushkin base, All-Union sci. res. Inst. of Plant Protection, trichodermin-3 was used with Leningradka winter wheat to determine its activity in inhibiting hard smut [*Tilletia caries*]. Applied at 800 g./sq. m. at sowing, it gave an increase in yield of 26·7% over untreated seed, and a 29·6% reduction of smut. No improvement was obtained by dusting the seeds or treating them with a culture of *Trichoderma lignorum* [*T. viride*]. Though the introduction of trichodermin-3 into the soil considerably limited the development of smut, the contamination of the grain was 0·6%. In similar field experiments trichodermin-3 reduced fusariosis [*Fusarium lini*] and anthracnosis [*Colletotrichum linicola*] of flax from 15·4% to 9·5% and root rots (*Fusarium* spp.) in spring wheat from 4% to nil.

Misato (T.), Asakawa (M.), & Fukunaga (K.). **Translocation of antibiotics in plants. (2). The upward and downward translocation of some antifungal antibiotics in Broad Bean and in Rice plants.** *Ann. phytopath. Soc. Japan*, **23**, 4, pp. 181–184, 1958. [Jap. Abs. from Engl. summ. Received Nov. 1959.]

At the Nat. Inst. agric. Sci., Kita-ku, Tokyo [cf. **38**, 244], 24 and 72 hr. after coating middle leaves of broad bean with a paste containing 30% liquid paraffin, 50% soft paraffin, 10% glycerin, and 10% antibiotic, the untreated leaves, stems, and roots were collected and homogenized with methanol or acetone. Paper disk or cup assay on plates seeded with *Piricularia oryzae* revealed that antimycin A, blasticidin, and blastmycin were translocated upwards into the leaves and stems, downwards into leaves and stems, and, in very small amounts, into the roots. Humidin, eurocidin, and actidione were not translocated. Blasticidin retained $\frac{1}{3}$ of its original activity after 4 days, but none after 7 days: some activity of antimycin A and blastmycin was still detectable on the 7th day. In similar experiments with rice seedlings there was some translocation of antimycin A, blasticidin, and blastmycin to the upper stems and leaves and also to the roots.

Inoue (T.), Okamoto (Y.), & Nishikado (Y.). **Microorganisms producing antibiotics effective against plant pathogens. IV. Imoticidin, a new antibiotic produced by Streptomyces albus C 1–2. V. Production of imoticidin by S. albus C 1–2 in soil and the preventive effect of imoticidin against Corticium centrifugum.**—*Nôgaku Kenkyû* [*Agric. Stud.*], **46**, pp. 120–128, 1959. [*Chem. Abstr.*, **53**, 21, col. 20268 f–20269 a, 1959.]

The max. amount of imoticidin was produced on a medium of wheat bran 3, sucrose 2, and 0·1% K_2HPO_4 by shaking at 28° C. for 6–7 days. The processes of filtration, extraction, and purification are described.

S. albus produced 60 μg./g. imoticidin on natural soil and the yield was increased to 130 μg. by mixing in wheat bran. A decrease to 60% resulted from contact with *C. centrifugum* and a marked decline from the addition of 1% KNO_3, but 1% $Ca(OH)_2$ stimulated production. The pathogen made no growth on soil cultured with *S. albus* but developed freely on the same extracted with alcohol. The antibiotic inhibited the growth of the fungus on natural soil and the added imoticidin was preserved at 80% of initial activity after 14 days in the soil.

Casida (L. E.). **Phosphatase activity of some common soil fungi.**—*Soil Sci.*, **87**, 5, pp. 305–310, 1 graph, 1959.

At Pa State Univ. enzyme extracts from representative soil fungi, including 16 *Aspergillus* spp., *Penicillium* sp., *Mucor* sp., and *Rhizopus* sp., were examined at acid pH for phosphatase activity on a number of P-containing compounds similar to those found in the soil. It was apparent that some *Aspergillus* spp. have especially active acid phosphatases for such compounds, in particular a phytase which will partially dephosphorylate ferric phytate, previously considered almost inert in the soil.

New soil sterilizing unit.—*Parks*, **25**, 2, p. 110, 2 fig., 1959.

A smaller type of soil steam sterilizer, the 'Junior' (ordinary or de luxe model) of the 'Terra Force', is manufactured by Terra Force (G.B.) Ltd. of Replant Works, Woolwich Industrial Estate, London, S.E. 18 [cf. **30**, 245; **38**, 188]. The main part, simply devised so as to enable operation by unskilled labour, comprises a tilted revolving drum 6 ft. × 12 in. diam. and a wire mesh screen to break up the soil and separate large stones. The steam treatment is effected in the drum within 15 sec. at a temp. adjustable from 160 to 190° F., and the soil, after cooling, is ready for immediate cultivation. The capacity of the machine is 1½–2 cu. yd. hr.

The unit can operate on both paraffin and gas oil. A butane torch is conveniently used for lighting and a 6–8 min. heating of the vaporizing coils is required to ignite the burner. The apparatus may be run in glasshouses and potting sheds or transported to the site.

Schönhar (S.). **Eisenmangel-Chlorose an Forstpflanzen.** [Iron deficiency chlorosis in forest plants.]—*Allg. Forstz.*, **13**, 10, pp. 149–151, 1958.

At the Forstliche Versuchsanstalt, Stuttgart, a chlorosis [**38**, 67] widespread in forests (both broad-leaved and conifer) in S.W. Germany was shown to be associated with soil alkalinity, the most heavily affected trees being on soils with a pH approaching 8. On Scots pine and *Pseudotsuga* [*menziesii*] soil application of 'BASF (Badische Anilin- und Sodafabrik) chlorosis preparation', an FeEDTA chelate, begun in 1957 was without effect, but very satisfactory control was obtained by spraying. The results confirmed the surmise that the chlorosis was due to Fe deficiency.

Van Alphen (T. G.). **Spraying crops with copper.**—*Centr. Landbouwdocum. Literatuuroverz.* 20, 65 pp., 1957. [*Chem. Abstr.*, **53**, 21, col. 20651 d, 1959.]

From a survey of 368 contributions to various aspects of this subject it was concluded (*inter alia*) that spray concs. of 0·005 p.p.m., 0·01–0·2%, and 0·04–0·4% were adequate to counteract Cu deficiency in tomato, cereals, and fruit trees, respectively. Toxic effects may develop, however, with conc. as low as 2 p.p.m. in tomato, 0·01–0·1 p.p.m. in the root systems of several higher plants in immediate contact with Cu solution, and 4–8 p.p.m. in maize and beans [*Phaseolus vulgaris*] in water culture. Cu is extremely immobile in soils and is usually fixed by organic matter, thereby giving rise to the common deficiencies in peat soils and new reclamations. These may occur, e.g. in oats and wheat, at Cu levels of < 2 and 3 p.p.m., respectively. Soil amendments of 11–22 lb. $CuSO_4$/acre may produce long-lasting effects, while sprays of 1·5–3% at 80 gal./acre are recommended for the control of current deficiencies. Immersion of millet [unspecified] seed in a 0·25% $CuSO_4$ solution has proved beneficial [cf. **38**, 735].

Henkens (C. H. H.) & Lehr (J. J.). **Borium op bouwland.** [Boron in farmland.]—*Landbouwvoorlichting*, **16**, 7, pp. 339–344, 3 fig., 4 graphs, 1959.

This is a joint report from the Instituut voor Bodemvruchtbarheid, Groningen,

and the Laboratorium voor Bemestingsonderzoek, Wageningen, on an inquiry during 1955–6 into B deficiency, which has been observed in the Netherlands in swedes, lucerne, and once in potato, besides beet [**29**, 495]. In lucerne, which is highly susceptible, the leaves develop a faded brown to greyish-yellow discoloration, while in potatoes the foliage is thickened and brittle, the vascular bundle ring has a partial or total brown discoloration, and the interior of the tuber, as in swedes, is glassy.

In the dry summer of 1955, in plots with a hot water-soluble B level of or below 0·35 p.p.m., 73% beet plants were affected by heart rot compared with 38% in plots with >0·35 p.p.m. In the wet season of 1956 symptoms of deficiency occurred almost exclusively in plots with a B level < 0·3, which for the present may be taken as the threshold value. In neither year did any influence appear to be exerted by the soil pH. Analyses revealed the max. B conc. (av. 4·61) in marshland, followed by marine (1·78), and river clay (1·75), with particularly low levels in sandy soils (0·43 and 0·57).

Verona (O.) & Benedek (T.). **Iconographia Mycologica I.**—*Mycopathologia*, **11**, Suppl., 105 pp., 50 pl., 1959. 20 Dutch guilders (not available separately).

In the 1st fascicle of this new series line drawings (not to scale) are presented on loose sheets depicting the salient features of 34 genera of Fungi Imperfecti, 15 of Phycomycetes, 27 of Ascomycetes, and 6 of Protomycetes, accompanied by brief notes.

Săvulescu (Olga). **Noutăți fitopatologice în RPR.** [New plant diseases in the Romanian People's Republic.]—*Comun. Acad. RPR*, **8**, 11, pp. 1161–1168, 1958. [Russ., Fr. summ. Abs. in *Referat. Zh. Biol.*, *1959*, 19, p. 194, 1959.]

Ascochyta boehmeriae is reported on ramie [*Boehmeria nivea*] leaves and *Urophlyctis* [*Physoderma*] *alfalfae* [map 130] causing root canker of lucerne. The latter is a quarantine disease. The symptoms of infection and the biology of the causal agents are described.

Kleiner (B. D.). Видовой состав грибов — возбудителей заболеваний древесных пород и кустарников в горных районах Узбекистана и их систематическая характеристика. [The fungus species composition—the causal agents of diseases of forest trees and shrubs in the mountain regions of Uzbekistan and their systematic character.] Труд. Среднеаз. н.-и. Ин-та лес. Хоз. [*Trud. Sredneaz. n.-i. In-ta les. Khoz.*], *1958*, 3, pp. 248–260, 1958. [Abs. in *Referat. Zh. Biol.*, *1959*, 18, p. 102, 1959.]

A systematic list of 120 spp. of fungi is given, comprising 57 fungi imperfecti, 43 basidiomycetes, and 20 ascomycetes.

Mehtieva (Mme N. A.). Материалы к микофлоре Куба-Хачмасского массива Азербайджана. [Materials for the mycoflora of the Kuba-Khachmas massif in Azerbaijan.]—Изв. Акад. Наук Азерб. ССР [*Izv. Akad. Nauk Azerb. S.S.R.*], Ser. biol. agric. Sci., *1958*, 1, pp. 11–22, 1958; *1959*, 3, pp. 19–31, 1959. [Russian with Azeri summary; 27 ref.]

In the 1st paper from the V. O. Komarov Bot. Inst., Leningrad, 121 spp. (36 genera) collected in 1953–4 are listed, of which 91 are rusts [**38**, 732], including *Uromyces fabae* on *Vicia angustifolium* and *V. sepia*, *U. scirpi* on carrot, *Puccinia carthami* on *Carthamus* sp., and *P. menthae* on *Mentha longifolia*, *M.* sp., and *Origanum vulgare*.

In the 2nd paper there are 81 spp. and forms of ascomycetes collected in 1951–54 in the Kuba, Kusar, and Khachmas areas. Details are given of locality, asci and spore measurement, and hosts. Included are *Claviceps purpurea* on wheat and

grasses, *Epichloe typhina* on *Dactylis glomerata* and other grasses, *Lophodermium pinastri* on pine [map 371], *Taphrina bullata* on pear, *Sphaerotheca fuliginea* on vegetable marrow, and *S. pannosa* [var. *persicae*] on peach.

Mehtieva (Mme N. A.). Виды грибов рода **Septoria** северо-восточной части Азербайджанской ССР. [Species of fungi of the genus *Septoria* from the north-eastern part of Azerbaijan S.S.R.]—Изв. Акад. Наук Азерб. ССР [*Izv. Akad. Nauk Azerb. S.S.R.*], Ser. biol. agric. Sci., *1958*, 6, pp. 103-107, 1958. [Russ., Azeri summ.]

During an expedition to the Kuba, Kusar, and Khachmas areas of Azerbaijan in 1952–54 [cf. above], 31 spp. of *Septoria* were collected, of which 1 is new to science; included were *S. cucurbitacearum* on pumpkin, *S. rubi* on *Rubus* spp., *S. piricola* [*Mycosphaerella sentina*: map 325] on pear and wild caucasian pear, *S. apii* on celery, *S. carotae* on carrot, *S. lycopersici* on tomato [map 108], *S. mespili* on medlar, and *S. petroselini* on parsley.

Dzhafarov (S. A.). Грибы из рода **Sphaerotheca Lév.,** паразитирующие на Персике, Розе и Хмеле в Ленкоранской зоне Азербайджанской ССР. [Fungi of the genus *Sphaerotheca* Lév. parasitizing Peach, Rose, and Hops in the Lenkoran zone of Azerbaijan.]—Изв. Акад. Наук Азерб. ССР [*Izv. Akad. Nauk Azerb. S.S.R.*], Ser. biol. agric. Sci., *1958*, 4, pp. 3–10, 1958. [Russ., Azeri summ.]

In the course of mycological expeditions to various areas of the Azerbaijan S.S.R., including the Lenkoran zone, in 1935–38 and 1944–56, representative collections of the fungi of the area, and especially powdery mildews, were made. The author is the first to present data on the distribution of *Sphaerotheca pannosa* var. *persicae* on peach in the Lenkoran zone. *S. p.* var. *rosae* [**38**, 211] is widely disseminated on both cultivated and wild roses. *S. macularis* f. *humuli* [*S. humuli*] was noted on hops in the low-lying forests of the subtropical Lenkoran zone.

Dzhafarov (S. A.). Грибы из рода **Microsphaera Lév.,** паразитующие на реликте третичного периода (Каштанолистном Дубе) и на кустарниках Талыша. [Fungi of the genus *Microsphaera* Lév. parasitizing a survivor of the Tertiary period (Chestnut-leaved Oak) in the thickets of the Taluish.]—Изв. Акад. Наук Азерб. ССР [*Izv. Akad. Nauk Azerb. S.S.R.*], Ser. biol. agric. Sci., *1958*, 2, pp. 11–16, 1958. [Russ., Azeri summ. 29 ref.]

While collecting in various areas of Azerbaijan, especially in the subtropical Lenkoran zone [cf. above], *Microsphaera alphitoides* [cf. **37**, 318] was found on oak spp., *M. berberidis* on *Berberis* spp., *including B. vulgaris* and *B. iberica*, and *M. lonicerae* on *Lonicera caucasica*. For each sp. the author gives full synonyms, measurements, locality, date of collection, and a commentary on the bioecology and specific characters.

Christiansen (M. P.). **Danish resupinate fungi. Part 1. Ascomycetes and Heterobasidiomycetes.**—*Dansk. bot. Ark.*, **19**, 1, pp. 1–55, 46 fig., 1959.

This work, designed primarily for the identification of the resupinate fungi of Denmark, is based mainly on material collected by the author. Keys to the 13 genera are provided. Worthy of note is *Helicobasidium purpureum* [map 275] on oak, poplar, and raspberry.

Lindeberg (Brita). **Ustilaginales of Sweden (exclusive of the Cintractias on Caricoideae).**—*Symb. bot. upsaliens.*, **16**, 2, 175 pp., 1959. Kr. 20. [220 ref.]

This study (edited and augmented by J. A. Nannfeldt since the death of the author) covers not only the smut spp. (143 in all) actually found in Sweden (treated in

alphabetical order of genera and spp.) but also those that are able to attack Swedish host plants, and includes in addition all smut spp. and host spp. known from any of the Nordic countries. There is a key to the genera and keys for some of the larger genera. *Urocystis agropyri* is reported to be rather common on *Elytrigia repens* in S. and central Sweden [map 80]. One new sp. is described, *Urocystis trollii* Nannf. on cultivated *Trollius*.

Schüepp (H.). **Untersuchungen über Pseudopezizoideae sensu Nannfeldt.** [Studies on Pseudopezizoideae.] —*Phytopath. Z.*, **36**, 3, pp. 213–269, 12 fig., 1959. [Engl. summ. 78 ref.]

This new grouping of the Pseudopezizoideae is based on work at the Inst. spez. Bot., Zürich, Switzerland. Four genera only are recognized: *Pseudopeziza*, *Leptotrochila* (syn. *Ephelina*, *Placopeziza*, and *Fabraea*), *Pseudorhytisma*, and *Spilopodia* (not discussed here); keys to the genera and spp. are given. Morphological work was supported by cross-inoculations and cultural investigations. Only 3 spp. are included in the 1st genus, *Pseudopeziza trifolii* (syn. *P. medicaginis*) with its f.spp. *medicaginis lupulinae*, *medicaginis sativae*, *meliloti*, *trifolii pratensis*, and *trifolii repentis* (the last 2 being new), *P. singularis*, and *P. calthae*. In the 2nd genus there are 14 spp., including *L. medicaginis* (syn. *P. jonesii* and *Pyrenopeziza medicaginis*). Details are given of the formation of the stroma, apothecia, and excipulum, which are considered to be important diagnostic features.

Tempel (A.). **Serologisch onderzoek bij Fusarium oxysporum.** [A serological study of *F. oxysporum*.] *Meded. LandbHoogesch. Wageningen*, **59**, 7, pp. 1–60, 9 fig., 8 diag., 1959. [Engl. summ. 79 ref.]

Further exhaustive studies on a number of f.spp. of *F. oxysporum*, including *pisi* and *lupini* [**37**, 212], were undertaken to determine the applicability of serological methods to the differentiation of physiologic races and f.spp. The mycelium was found to contain glycoproteins which split up into polysaccharides and various proteins during both autolysis of the cultures and mycelial extraction. In alkaline extracts they remain fairly stable but lose their antigenicity.

Rabbits produce antibodies against proteins only after injection with culture filtrates or saline mycelial extracts. The polysaccharides are much more stable than the proteins but immunization against the former is obtainable only with microconidia.

The antigens of *F. oxysporum* resemble those of G[ram]+ bacteria, the cell walls of which also contain glycoproteins. The present investigations demonstrated that the polysaccharides from the glycoproteins are haptens; their nature in bacteria is unknown.

Sasaki (Y.) & Yoshida (T.). **A taxonomic re-examination of bread yeast preserving in Japan.**—*Mem. Fac. Agric. Hokkaido Univ.*, **3**, 2, pp. 151–162, 1959. [3 tables, key to spp., and summ. in Engl.]

Of 75 strains of bread yeast from 12 culture collections in Japan, 66 were classified (following Lodder & Kreiger van Rij [**31**, 567]) as *Saccharomyces cerevisiae* group, 8 as named spp. of *Candida*, and 1 as *Hansenula anomala*.

Sasaki (Y.) & Yoshida (T.). **A taxonomic reconsideration on the alcohol fermenting yeast preserving in Japan. A taxonomic reconsideration of lactose fermenting yeast preserving in Japan.**—*Mem. Fac. Agric. Hokkai Univ.*, **3**, 2, pp. 163–177, 178–184, 1959. [6 tables, keys to spp., and summ. in Engl.]

Of 188 strains of alcohol fermenting yeast from 18 culture collections in Japan, 111 were classified [cf. above] as *Saccharomyces cerevisiae* and its var. *ellipsoideus*, 76 in 7 *S.* spp., and 1 as *Candida pelliculosa*.

Of 116 strains labelled 'alcohol fermenting yeast', but not named decisively, most were identified as *S. cerevisiae* var. *ellipsoideus*. Generally, most of such strains are classified under this var. In the authors' classification system consideration is given to the characteristic behaviour of the spp. to sugars, their assimilation of nitrates, morphology of cells, and pellicle and spore formation.

Of the 25 strains stated to be lactose fermenting yeasts from 5 culture collections, 16 were classified as *Candida pseudotropicalis*, 2 as *C. p.* var. *lactosa*, 3 as *Saccharomyces lactis*, and 4 as non-lactose-fermenting.

Taha (E.-E. M.) & Sharabash (M. M.). **A simple method for studying the effect of relative humidity on fungal growth.** *Egypt. J. Bot.*, **2**, 1, pp. 57–58, 1 fig., 1959.

Cultures of 5 *Fusarium* spp. causing tomato rot were tested at the Nat. Res. Centre, Dokki, Cairo, under different degrees of humidity obtained by using sterile NaCl solutions at 5 concs., 30 ml. of each in Petri dishes of 10 cm. diam., which then were covered with the lids containing 15 ml. of Dox's agar medium and fixed with adhesive tape. After 48 hr. inoculum was seeded at the centre of the agar and the lids refixed.

Pady (S. M.). **A continuous spore sampler.**—*Phytopathology*, **49**, 11, pp. 757–760, 4 fig., 2 graphs, 1959. [19 ref.]

A more detailed account [**37**, 79] is given from Kans. State Univ., Manhattan, of the construction of the apparatus [cf. **37**, 27]. The upper, rotatable half of the sampling column, to which a Dayton blower pump (50 cfm) is attached, has a 14×2 mm. aperture, protected by a rain shield and positioned by a wind vane, less than 1 mm. from the silicone-coated slide. The slide is elevated once hr. by a timing mechanism actuated by electric motors. At an air flow rate of 0·4 cu. ft. min. efficiency is at least 50%.

Preliminary studies have shown hr.-to-hr. variations of air spora [cf. **39**, 85], with peaks up to 50 spores/cu. ft., usually in the afternoon, but sometimes at night, and a high level of mycelial fragments.

Garver (J. C.) & Epstein (R. L.). **Method for rupturing large quantities of micro-organisms.**—*Appl. Microbiol.*, **7**, 5, pp. 318–319, 1 graph, 1959.

At the Depts of Biochem. and Bact., Univ. Wis., Madison, the Eppenbach laboratory colloid mill, model QV-6 with a 2-in. diam. rotor, operating at 8,000 r.p.m., was used with glass beads on bacteria and fungi. In a run with a hybrid yeast strain (*Saccharomyces fragilis* $610 \times$ *S. dobzhanskii* 1974), using 1–20 μ beads, opt. breakage (99%) was obtained in 20 min. with 60 ml. beads 100 ml. suspension (100 g./50 ml.) with a mill setting of 0·03 in. With baker's yeast cake (170 mg. dry wt./l.) max. protein liberation occurred after 10 min. with 120 μ beads. Preliminary experiments suggest that this method can be used equally well for breaking mould mycelium. Over 95% breakage of *Aspergillus niger* mycelium was obtained in 3 min. The shearing forces with cell bead slurries in devices such as the Waring Blendor are much less than can be achieved with a colloid mill.

Iyengar (M. R. S.), Srivastava (D. N.), & Sastry (M. L. N.). **A study on the preservation of fungal cultures by the mineral oil method.**—*Indian Phytopath.*, **12**, 1, pp. 90–98, 1959. [36 ref.]

In the Type Culture Collection, Indian agric. Res. Inst., New Delhi, more than 100 spp. of all groups were stored under mineral oil ('nujol': Fassett and Johnston Ltd., London) over 8 yr. The findings (tabulated) indicated differences in viability in closely related fungi [cf. **28**, 230]; only 6 survived 8 yr.; 28 spp. failed to survive 4 yr.

Burnet (F. M.) & Stanley (W. M.) (Editors). **The viruses. Vol. I. General virology.**—xvii+609 pp., 24 fig., 23 graphs. $16.50. 118*s*. **Vol. II. Biochemical, biological, and biophysical properties.**—xvi+408 pp., 43 fig., 25 graphs, 7 diag., New York and London, Academic Press, 1959. $13.

Vol. I comprises review articles on the general problems of virus research, including the structure, chemistry, immunology, and reproduction of viruses. Amongst these may be noted contributions by H. Fraenkel-Conrat on 'The chemical basis of the infectivity of tobacco mosaic virus and other plant viruses', by F. M. Burnet on 'The scope and limitations of immunological methods in the characterization and functional study of viruses', and by S. E. Luria on 'The reproduction of viruses: a comparative survey'. Each article is followed by a generous bibliography, and there are author and subject indexes.

Vol. II comprises articles by S. G. Wildman on 'The process of infection and virus synthesis with tobacco mosaic virus and other plant viruses', R. Markham on 'The biochemistry of plant viruses', C. A. Knight on 'Variation and its chemical correlates', L. M. Black on 'Biological cycles of plant viruses in insect vectors', A. Lwoff on 'Bacteriophage as a model of host-virus relationship', A. Garen & L. M. Kozloff on 'The initiation of bacteriophage infection', G. S. Stent on 'Intracellular multiplication of bacterial viruses', C. Levinthal on 'Bacteriophage genetics', F. Jacob & E. L. Wollman on 'Lysogeny', and F. W. Stahl on 'Radiobiology of bacteriophage'.

[Vol. III is concerned with animal viruses.]

Vasudeva (R. S.). **Plant virus research in India.**—*Indian Phytopath.*, **12**, 1, pp. 1–7, 1959.

In this presidential address, delivered at the 11th Annual General Meeting of the Indian phytopath. Soc. in Jan. 1959, a brief account of world virology, as illustrated by some major virus diseases, and reference to various aspects of the subject was followed by a general account of the virus diseases investigated by the Indian agric. Res. Inst. [**39**, 73] with mention of the major features and possibilities of control of many of these.

Boorman (J. P. T.) & Knott (E. C.). **The construction of a simple tissue grinder for virus studies in small insects.** *Virology*, **9**, 2, pp. 291–292, 1959.

This apparatus, devised at the W. African Council for med. Res. Lab., Yaba Lagos, Nigeria, is preferred to the more complicated apparatus of Bugher (*Proc. Soc. exp. Biol. Med.*, **43**, pp. 422–423, 1940) for the emulsification of insects or dissected insect tissues.

A pyrex glass tube (5 × 115 mm.) acts as the container, and a 6-in. glass rod, slightly too broad to fit into it, is ground into it by use of fine carborundum and water. The end of the rod is then ground on an emery wheel to fit the rounded end of the tube. A constriction is made in the rod, 1 in. from the end, by drawing it out in an oxy-acetylene flame. To ensure that it remains straight it is placed in the tube and rotated while still soft. The 0·5- and 1-ml. levels are marked on the tube with a diamond. One grinder takes 10 min. to make.

Simons (J. N.). **Variation in efficiency of aphid transmission of southern Cucumber mosaic virus and Potato virus Y in Pepper.** –*Virology*, **9**, 4, pp. 612–623, 1959.

At the Everglades Exp. Sta., Belle Glade, Fla, considerable differences were demonstrated in the ability of several clones of the cotton aphid (*Aphis gossypii*) to transmit southern cucumber mosaic virus in *Capsicum annuum* (var. California Wonder) [cf. **38**, 52]. Such differences were not demonstrable when the same clones were used as vectors of potato virus Y in the same host.

In attempts to change vector efficiency of some of the clones, a change of host plant sp. only slightly affected the efficiency of transmission, nor was it consistently affected by changing the plant sp. supplying the inoculum. Selection of subclones from aphids with histories as vectors did not change the efficiency of a clone, and the use of inoculum source plants having histories of transmission by the same clone of aphid did not affect the vector efficiency of the aphid clones tested.

HEINZE (K.). **Über das Verhalten unbeständiger phytopathogener Viren bei der Übertragung durch Blattläuse.** [On the behaviour of non-persistent phytopathogenic viruses in aphid transmission.]—*Phytopath. Z.*, **36**, 2, pp. 131–145, 1959. [Engl. summ.]

In further studies [**36**, 750] at the Inst. für gärtnerische Virusforschung, Berlin-Dahlem, potato Y, tobacco mosaic, and turnip mosaic viruses were used, and the vectors were *Myzodes* [*Myzus*] *persicae*, *Macrosiphum solanifolii* [*M. euphorbiae*], and *Acyrthosiphum onobrychis* [*A. pisum*]. After short feeding times to acquire potato virus Y the ends of beaks were cut off, centrifuged in water and the solution inoculated into tobacco plants, but no infections were secured. The same applied to protruding stylets, dipped into virus solution. Inoculation with aphids (or legs only), after dipping in a solution of virus Y and drying, by carborundum rubbing on wetted tobacco leaves produced infections as long as 4 hr. after dipping.

Aphids infected with a non-persistent virus, when placed on water with their protruding stylets immersed, retained full infectivity for 10 min., a sharp decline occurring after $\frac{1}{2}$ hr. It was impossible to make aphids infectious by dipping stylet tips of narcotized adults into solutions of potato virus Y or turnip mosaic virus, by feeding non-persistent virus solutions to aphids with a micropipette, by puncturing them with a fine needle dipped in virus solution, or by injecting virus into the body. Body fluids inactivate the virus or have an inhibitory effect when the ratio of body fluid to virus conc. is relatively high.

In plants infiltrated with solutions of non-persistent viruses the stylets penetrating the plant tissues can aid the passage of virus into the plant cells. Virus sprayed on the leaf surface does not penetrate into the upper cell layers when aphids suck on the (wet) leaves. They are unable to pick up non-persistent virus when the virus solution is infiltrated into the intercellular space. Non-persistent viruses remain infective in the vector for a very long time when the aphid is kept at −1° C. After a short infective feeding time on a turnip plant infected by turnip mosaic virus and transference to −1°, aphids could infect more than $\frac{1}{2}$ of the test plants after 6 days, sometimes even up to 8 days. *M. persicae* infected with cucumber mosaic virus and then transferred to −5° remained infective for more than 40 hr. In a few cases aphids could pick up a non-persistent virus from wetted filter paper even when the virus impregnation of the paper was made months earlier.

HEINZE (K.). **Beitrag zur Ermittlung neuer Übertrager für phytopathogene Viren.** [A contribution to the determination of new vectors for phytopathogenic viruses.] *-Z. PflKrankh.*, **66**, 7, pp. 391–395, 1959. [Engl. summ.]

In further studies [cf. above; **38**, 314 *et passim*], the aphids *Myzotoxoptera tulipaella* [*Rhopalosiphoninus staphyleae*], *Disaulacorthum vincae*, and *Metopolophium primulae* transmitted turnip mosaic virus and an [unspecified] str. *M. primulae* and *R. staphyleae* also transmitted the tobacco vein browning str. of potato virus Y [**39**, 242], and the latter transmitted tomato aspermy virus. Cucumber mosaic virus was transmitted, though not very effectively, by both *Cryptomyzus korschelti* and *R. staphyleae*.

Neomyzus circumflexus [*Aulacorthum circumflexum*] transmitted beet yellows virus to approx. 66% of *Chenopodium foliosum* test plants; *M. primulae* was

rather ineffective. *R. staphyleae* transmitted potato leaf roll virus, and may be an occasional vector of it.

It is concluded that in experiments with semipersistent and persistent viruses the compatibility of plant and aphid is more important than with non-persistent viruses, and that for persistent the feeding time should be relatively long.

Holmes (F. O.). **Transmission of Potato mottle virus to, and from, Citrus plants by mechanical inoculation.** *Phytopathology*, **49**, 11, pp. 729–731, 1 fig., 1959.

A more detailed account from the Rockefeller Inst., N.Y., of information on the ring spot str. of potato virus X already noticed [**39**, 161]. Only 3 lesions were secured and were found 6-7 months after inoculation. No infections were obtained with tobacco mosaic and tobacco ringspot viruses.

Jedlinski (H.). **Studies of the initial infection processes by certain mechanically transmitted plant viruses and their hosts.**—*Diss. Abstr.*, **20**, 1, p. 43, 1959.

At the Univ. Neb. leaves of *Nicotiana sylvestris* and Scotia bean (*Phaseolus vulgaris*), inoculated with tobacco necrosis virus (TNV) and tobacco mosaic virus (TMV) or its yellow str. (YTMV), after being mildly wounded under specified conditions, developed a uniformly low level of infection, thus greatly reducing possible error in determining the number of infection points.

There was a significant decrease in the receptivity of *N. sylvestris* for YTMV when inoculation was delayed for 1 min. or more after wounding; with TNV, however, low infection in the first few sec. increased thereafter up to 5 min. and remained high. Similar results were obtained on bean with TNV, whereas with TMV different time intervals made no significant difference to the rather low level of receptivity.

When various combinations of the 3 viruses were used at 2 different opt. time intervals after mild wounding, phosphate buffer significantly reduced the receptivity of both hosts. That of *N. sylvestris* to YTMV, 10 min. after wounding, was significantly reduced when TMV was introduced as soon as possible after wounding. There was a similar effect with YTMV and TNV on bean, but not with TMV and TNV. Similar trends in the preferential receptivity of the hosts for specific viruses were observed with the change of time interval after wounding when the inoculum consisted of a mixture of viruses at the same conc.

It was demonstrated that all receptive sites in a host may be saturated with a virus when its conc. in the inoculum attains a certain level. These and other results are taken to indicate the differential and specific nature of the receptive sites, which appear to be most active at different times after wounding. As the nature and location of the sites appears to be different for each virus system studied, the successful establishment of an infection is not simply a function of the infectivity of the virus preparation, but depends also on the intrinsic reaction of the host. These results are not consistent with theories postulating that the entry of virus particles into the slightly wounded cells is, *per se*, sufficient to induce infection.

Nishi (Y.). **Inhibitory action of the pressed juice from some plants on which aphids were fed against the infectivity of Tobacco mosaic virus.**—*Ann. phytopath. Soc. Japan*, **23**, 4, pp. 185-188, 1958. [Jap. Abs. from Engl. summ. Received Nov. 1959.]

At Kyushu agric. Exp. Sta., Chikugo, Fukuoka Prefecture, extract from tobacco plants infected by tobacco mosaic virus (TMV) mixed with sap from Japanese radish, turnip, or tobacco plants on which a number of aphids (*Myzus persicae* or *Rhopalosiphum pseudobrassicae*) had been fed for 24 hr. produced fewer lesions on half leaves of *Nicotiana glutinosa* than did sap containing TMV+sap from aphid free plants. There was no inhibitory effect when sap from radish infected by radish

mosaic virus, mixed with sap of aphid infected plants, was inoculated on radish seedlings.

Loebenstein (G.). **Native protein, an immunizing agent against virus infection.**—*Nature, Lond.*, **185**, 4706, pp. 122–123, 1960.

Native protein, obtained from degraded purified tobacco mosaic virus, was shown to be free from virus by testing on *Nicotiana glutinosa* at the Rehovoth agric. Res. Sta., Israel. This protein reduced the number of lesions formed on *N. glutinosa* by subsequent inoculation with the virus if abraded on the leaf more than 24 hr. beforehand. Two doses of the protein were more effective than one. The effect is apparently not one of direct inhibition, as it did not occur when the 2 were used together, but may be due to the induction of 'protective substances' by the protein.

Jones (W. A.), Jacobson (M.), & Kahn (R. P.). **Chemical nature of a plant-virus inhibitor from Rice.**—*Nature, Lond.*, **184**, 4693, p. 1146, 1959.

Further studies at Beltsville and Glenndale, Md [cf. **37**, 113], showed that the inhibitor in rice extracts, in contrast to inhibitors from other plants, protects bean [*Phaseolus vulgaris*] leaves against tobacco mosaic virus even when applied to leaves (which are then rinsed) 1–3 days before inoculation. The inhibitor was concentrated in rice polish and could be extracted with water, but not methanol, which inactivated it. Addition of cold saturated $(NH_4)_2SO_4$ to the extract to 80% saturation, with centrifugation thereafter, gave a very active precipitate. The inhibitor is probably a protein with a high molecular weight; the aqueous extract loses its activity upon standing, even at 5–7° C.

Miyamoto (Y.). **Further evidence for the longevity of soil-borne plant viruses adsorbed on soil particles.**—*Virology*, **9**, 2, pp. 290–291, 1959.

In further experiments [cf. **38**, 501] at Hyogo Univ. of Agric., Japan, to determine the role of clay particles in the transmission of soil-borne viruses, sap from wheat plants infected by wheat yellow mosaic virus [soil-borne wheat mosaic virus (str.)] and barley infected by yellow mosaic virus [cf. **38**, 139] was added to certain sterilized clean soils, sterilized pellets of clay particles ($< 2\mu$ diam.) from virus-infected soils, kaolin, and bentonite, the materials being soaked in the sap in large Petri dishes and maintained (semi-wet) at 10–15° C. for about 8 months until late in the following autumn. Pregerminated seeds with 2–3 roots were grown in the materials for 14 days at 14–16°. The results indicated clearly that both viruses, which have generally been considered labile, were in fact rather stable under the conditions of the experiment, when they were adsorbed on kaolin, bentonite, or soil particles able to adsorb proteins.

It is concluded that the longevity of these viruses in soil need not be explained in terms of the presence of micro-organism vectors or diseased plant roots.

Bos (L.) & Van der Want (J. P. H.). **Virusziekten van Vlinderbloemigen.** [Virus diseases of the Papilionaceae.]—*Landbouwvoorlichting*, **15**, 10, pp. 550–558; 11, pp. 573–587, 18 fig., 1958. [Engl. summ.]

A programme is outlined for the systematic study of virus diseases of leguminous crops which has been started at the Instituut voor Plantenziektenkundig Onderzoek, Wageningen. Current information is given on those recorded in the Netherlands, viz. pea enation mosaic, pea mosaic, lupin mosaic [cf. **39**, 112], red clover vein mosaic [**38**, 503], bean common mosaic and bean yellow mosaic in *Phaseolus vulgaris*, tip yellows of pea [pea leaf roll virus: **39**, 114], white clover mosaic [**39**, 113], clover witches' broom (with virescence and phyllody of the flowers) [cf. **37**, 217, 243], cucumber mosaic in yellow lupin, peas, and alsike clover, lucerne mosaic, bean stipple streak (tobacco necrosis virus), and early browning of peas (a soil-

borne virus perhaps related to tobacco rattle virus). A shorter version [cf. **39**, 94] appears in *Tijdschr. PlZiekt.*, **64**, pp. 419–421, 1958.

Bennett (C. W.). **Lychnis ringspot.**—*Phytopathology*, **49**, 11, pp. 706–713, 5 fig., 1959.

At the U.S. agric. Res. Sta., Salinas, Calif., a greenhouse plant of *L. divaricata* was found with rings and zonate spots on the leaves. Systemic infection was induced in a number of plants, including *L. divaricata* and sugar beet, by sap inoculation, and local lesions (only) in others. Seed production was inhibited or reduced in some of the infected hosts. Transmission was not effected by dodder nor by 4 insect vector spp. Transmission by seed (42–58%) and by pollen (34–38%) occurred in *L. divaricata* and *Silene noctiflora* and by seed to a lesser extent in sugar beet and some but not at all other spp. tested. The virus is thermally inactivated between 64 and 68° C., remains active 2–7 days in sap at room temp., and has a dilution end-point ca. 1:2,000. The virus was active in seed of *L. divaricata* after 992 days' storage. The production of local lesions in some hosts indicated better adaptation of the virus to invasion of parenchyma than of phloem. Though apparently one of the ring spot group of viruses, it differs from the others in host range, induced symptoms, and low degree of recovery of most of its hosts.

Renaud (R.). **La première réunion technique de la F.A.O. sur le Cacao et les problèmes phytosanitaires que pose actuellement cette production.** [The first technical F.A.O. meeting on Cacao and on present-day phytosanitary problems arising in its production.]—*Agron. trop.*, **14**, 5, pp. 601–611, 1959. [Engl., Span. summ.]

Most of the points raised at this meeting, held at Accra, 8–15 Feb. 1959, have already been noticed [cf. **38**, 357]. With increasing frequency in the Ivory Coast and apparently in Ghana also a lethal apoplectic disease of cacao has been observed, involving rotting and die-back, often of young trees, death occurring within a few days without any previous symptoms. The cause is still unknown. *Botryodiplodia theobromae* [**37**, 466], which is known to play a part in the die-back of cacao trees in Papua and New Guinea, has been isolated from green wood and inoculated into young plants.

Spence (J. A.). **The problem of Phytophthora palmivora on the Cocoa plant.**—*J. agric. Soc. Trin. Tob.*, **59**, 1, pp. 97, 99–101, 103, 105, 107, 109–111, 1959.

This useful, popular paper reviews the economic importance of the disease, which in Trinidad [**38**, 657] has caused losses of 1·7% in dry areas and 68·5% in a wet month in a wet area; 36% was recorded for areas with over 100 in. rainfall. None of the commercial vars. shows much resistance. Clone S/C 28, reported to be resistant in Brazil, appears as susceptible to leaf infection as I.C.S.11. Inoculations suggest there may be some resistance in S.C.A.6. A reliable laboratory method or small-scale test for assessing resistance still needs to be devised.

Schroo (H.). **Acute zinc deficiency observed in Cacao on certain soil types in Netherlands New Guinea.**—*Netherlands J. agric. Sci.*, **7**, 4, pp. 309–316, 6 fig., 1959.

In addition to symptoms of Zn deficiency in cacao previously described [**30**, 459; **32**, 548] others observed by the Agric. Res. Sta., Manokwari, were premature leaf shedding, a die-back of the terminal shoots followed by a repeated branching of the twigs, and the very small thin growth of the terminal leaves right from the flushing stage onwards. A block of 4 yr. old Amelonado trees with acute symptoms sprayed every 10 days with 2½ g. $ZnSO_4$/tree from 10 Aug. 1958 to 10 Mar. 1959 showed considerable improvement and looked quite healthy. The av. Zn content of a sample of 20 leaves (2nd and 3rd fully-grown leaves from 10 branches) from 2 Zn-deficient controls was 20 p.p.m. and of 2 recovered trees 33 p.p.m.

Kobel (F.). **Resistenzzüchtung bei Getreide.** [Resistance breeding in cereals.]—*Mitt. schweiz. Landw.*, **8**, 1, pp. 3–12, 4 fig., 1960.

This article supplies concise information on the methods used and problems arising, mentioning the lines on which research is proceeding at the Eidgenössische Landwirtschaftliche Versuchsanstalt, Zürich-Oerlikon, Switzerland.

Björkman (I.). **Fysiologiska raser av strasädesrost i Sverige 1958.** [Physiological races of cereal rusts in Sweden 1958.]- *Bot. Notiser*, **112**, 4, pp. 433–440, 1959. [Engl. summ.]

This report from the Statens växtskyddsanstalt, supplementing previous information [cf. **38**, 75, 201], announces a notable reduction, especially in the northern part of S. Sweden, in the yield of oats due to crown rust (*Puccinia coronata*) [**38**, 201, 682], races 228 (including 1 sample from Norway), 231, and 239 being predominant; the occurrence of stem rust (*P. graminis* [f. sp.] *avenae*) [loc. cit.] on oats, particularly of races 3, 7, 6 (1 sample from Norway), and 6 A; races 17, 21, and 33 of stem rust (*P. g.* [f.sp.] *tritici*) [**38**, 75] on wheat, of which the race 21 was found on 80% of samples, including 1 from Finland; and wheat leaf rust (*P. triticina* [*P. recondita*]) [**38**, 75] with races 107 (1 from Finland) and 57 most common. These results were obtained from the investigation of 580 collections.

Bericht über die Tagungen der Fachgruppe Brandkrankheiten der Arbeitsgemeinschaft für Krankheitsbekämpfung und Resistenzzüchtung bei Getreide und Hülsenfrüchten in Giessen am 29.11.1957 und in Straubing am 20.6.1958. [Report on the conferences of the smut diseases section of the working party for disease control and resistance breeding in cereals and legumes held at Giessen on 29 Nov. 1957 and at Straubing on 20 June 1958.]—*Prakt. Bl. PflBau*, **53**, 6, pp. 207–253, 9 fig., 10 graphs, 1958.

At the Giessen conference G. Schuhmann (Institut für Pflanzenschutzmittelforschung, Berlin-Dahlem), reporting (pp. 208–212) on factors contributing to variation in the infection of wheat by *Tilletia tritici* [*T. caries*: **39**, 225], stated that storage time (0–8 days) following 8 disinfectants (pure Hg compounds and mixed preparations of hexachlorobenzene and pentachloronitrobenzene) exerted no differential action. In studies on the varying controllability of bunt collections (pp. 212–215) a possible connexion between bunt ball consistency and disinfectant action was evident, which diminishes as the spore dust becomes finer. In preliminary tests to determine the occurrence of physiological races of *T. caries* (pp. 215–217), Wahrberger Ruf was found to have the highest resistance of the winter wheats tested, remaining free from infection after inoculation with 6 bunt collections. Six race groups were distinguished on the winter vars. Carsten V, Mauerner begrannter Dickkopf, Strubes Stocken, Tassilo, and Trubilo and 4 on the summer vars. Heines Peko, Lichtis II, Peragis Garant, Strubes Fortschritt, and Wahrberger Onoldia. Differences in pathogenicity were less within bunt collections than between them.

F. Pichler, Vienna, discussed (pp. 217–219) 2 outbreaks of bunt on rye in the Salzburg area of Austria. Extensive stem dwarfing which occurred at Rauris was attributed to such factors as time of infection, temp., and the state of development of the host plant, though not to the var.; it was not thought to be a type of dwarf bunt (*T. contraversa*) [**38**, 364]. The problem of whether dwarf bunt can be identified on the basis of stem stunting and spore form, or whether intermediate forms between *T. caries* and *T. contraversa* exist, was dealt with by K. Böning, Munich (pp. 219–222). A comparison of different collections indicated that dwarf and 'normal' bunts are connected by forms intermediate both morphologically and physiologically, while a study of herbarium specimens of bunt spp. on cereals and

grasses (pp. 222–224) suggests that the spore type with pronounced reticulations and a strong slime layer is probably the original form of bunt persisting in the soil, from which the rapidly germinating bunt types developed as cultural forms. F. WAGNER, Würzburg, gave an account (pp. 225–226) of infection experiments with collections of wheat dwarf bunt from Bavaria. No physiological differentiation of races can yet be made, at least as regards field resistance. G. SCHUHMANN spoke (pp. 226–227) on the establishment of a varietal list for the elucidation of the problem of dwarf bunt races. The first step should be to obtain wheat vars. from abroad which show promise of resistance and to test them on several sites. The Biologische Bundesanstalt, Berlin-Dahlem, undertook to carry out infection tests with several bunt collections.

At the Straubing conference E. NIEMANN, Kiel-Kitzeberg (pp. 227–231), presented results of studies on the penetration and spread of *Tilletia* spp. in cereal plants [**38**, 362]. G. SCHUHMANN (pp. 231–238) in 'A contribution to the preparation of *Tilletia* cultures' was concerned primarily with obtaining pure lines for race comparison. Some of the procedures described in the literature are reviewed. F. WAGNER elaborated (pp. 242–248) on further experiments at the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, Munich, on the chemical control of barley loose smut (*Ustilago nuda*) [**38**, 507]. F. WAGNER, Würzburg, reported (pp. 250–253) on experiments for the control of snow mould [*Calonectria nivalis*] on winter rye [**37**, 344] in the Bavarian Forest. With brassicol super sprays (15 kg. ha.) more intensive cultivation is possible, and with suitable manuring yield may be increased by at least 3–8 dz./ha.

MEINERS (J. P.) & WALDHER (J. T.). **Factors affecting spore germination of twelve species of Tilletia from cereals and grasses.**—*Phytopathology*, **49**, 11, pp. 724–728, 1959. [14 ref.]

Studies at the agric. Res. Sta., Pullman, Wash., showed that germination of spores of *T. contraversa* [**38**, 508] is dependent on several factors. While light and one or more unknown soil factors (active in soil-extract agar and therefore soluble in hot water) are necessary for max. germination in addition to low temp., the degree of dependence on these factors varies with the source of the spores and the year of their collection. The opt. temp. for germination of *T. contraversa* from cereals and grasses and of 11 other *Tilletia* spp. from grasses ranged from 5 to 15° C., and rates of germination varied between spp. with the same opt. temp. and between different collections of the same spp. Light stimulated germination of some, had no effect on others, and inhibited that of 2 spp., though results varied somewhat with spores of different origin.

WOOD (L. S.). **Genetic variation of Helminthosporium sativum in relation to seedling blight of small grains.**—*Diss. Abstr.*, **20**, 4, p. 1136, 1959.

Of 103 isolates of *H. sativum* [*Cochliobolus sativus*: cf. **37**, 765] from 17 States, examined at the Univ. Minn., 52% were pathogenic to barley, 63% to wheat [cf. **38**, 362] and 31% to oats. The barley isolates tended to be highly pathogenic to wheat and somewhat less so to oats; 28% of the isolates were pathogenic to all 3; 31% were innocuous. There was no correlation between the source of isolate and virulence.

Monospore lines derived from moderately and highly virulent cultures tended to have the same virulence as, or greater virulence than, the parent, while progeny from cultures of weak virulence tended to have the same virulence as, or less than, the parent.

Three of the 4 isolates tested on 3 vars. of barley caused the same relative amount of disease in sterilized and non-sterilized soil. Inoculation of 5 barley vars. in the field with a mixture of races resulted in statistically significant reductions in stand,

plant height, and yield (losses 30–71%). Leaf blight on barley was markedly reduced by [unspecified] application of S and manzate.

Ponchet (J.). **Essais de produits au laboratoire et en serre sur le développement du Cercosporella herpotrichoides Fron. agent du piétin-verse des céréales.** [Trials of products in laboratory and greenhouse on the development of *C. herpotrichoides*, agent of eye-spot of cereals.] —*Phytiatrie-Phytopharm.*, **8**, 2, pp. 91–102, 1959.

At the Sta. de Pathologie végétale, Versailles, maleic hydrazide, the ethylic and isopropylic esters of 2-4-D, and the ethylic ester and Na salt of MCPA had no value against *C. herpotrichoides* [**38**, 682] on wheat in greenhouse tests, though all had shown promise *in vitro*. Soil treatments with pentachloronitrobenzene and hexachlorobenzene had some effect, attributed to systemic action, but are not of practical interest.

In 2 tests under glass the fungicides were sprayed on 15 days after inoculation: 0·15% chloroglycinephenyl mercury chlorohydrate (2·6% Hg) was very effective, limiting penetration to the first sheath, but it caused some scorching of the first leaves; 50% captan and 65% zineb at 1% were effective, but much less so. Copper oxyquinolinate (20% active) also at 1% showed considerable promise in a preliminary trial.

Hansen (L. R.) & Aastveit (K.). **Forgrødeforsøk på fotsykesmittet jord.** [Rotation experiments on foot rot infested soil.]—*Forskn. Fors. Landbr., 1959*, pp. 89–126, 10 fig., 1 graph, 1959. [Engl. summ.]

This is a more detailed account [cf. **38**, 136] of experiments in SE. Norway in 1955–57 to determine if 1 or 2 yr. rotation with oats and or oil crops would reduce the incidence of *Ophiobolus graminis* and *Cercosporella herpotrichoides*, which sometimes cause up to 50% reduction in yields of barley and spring wheat. After 2 yr. cultivation with oats and oil (mustard) crops incidence was reduced on barley by 32·8 and on spring wheat by 17·8% and an average increase in barley yield of 26 kg./decare was obtained; after 1 yr. with oats incidence reductions were 22·8 and 18·2%, respectively. Sowing red clover in 1956 increased the barley yield in 1957 by 83 kg. grain and 111 kg. straw/decare in 1 experiment and attack by *O. graminis* was reduced, though that of *C. herpotrichoides* was somewhat heavier.

Campbell (W. P.) & Freisen (H. A.). **The control of ergot in cereal crops.**—*Plant Dis. Reptr*, **43**, 12, pp. 1266–1267, 1959.

In further studies at Canada Dept Agric., Edmonton and Lacombe, Alta [**37**, 159; **39**, 22], attempts were made to suppress gramineous hosts of *Claviceps purpurea* near cereal crops without using herbicides. A single spray of maleic hydrazide on grasses on 5 June at 8 lb. active ingredient/acre inhibited heading and so eliminated the chief source of inoculum.

Ostrovskiĭ (N. I.), Libizov (N. I.), Dobrovol'skaya (Mme A. P.), Pimenova (Mme L. D.), & Semenova (Mme L. P.). Алкалоидность и распространение спорыньи в СССР. [Alkaloid content and dissemination of ergot in the U.S.S.R.]—Аптечное Дело [*Aptechnoe Delo*], **8**, 1, pp. 29–34, 1959. [Engl. summ.]

From the All-Union sci. res. Inst. for medicinal and aromatic Plants, Ministry of Health of the U.S.S.R., a sharp decrease of *Claviceps purpurea* on cereals is reported in all regions of the U.S.S.R. in recent years from the improvement of agricultural techniques. Alkaloid content [**38**, 202, 364 and below] varies according to the area, but the best zone for collection and storing for pharmacological purposes is the forest-steppe, where climatic conditions are favourable and alkaloid content rather high.

Zabolotnaya (Mme E. S.). Содержание алкалоидов в спорынье, паразитирующей на различных дикорастущих злаках и гибридных формах Ржи и Пшеницы. [Alkaloid content of ergot parasitizing various wild cereals and hybrid forms of Rye and Wheat.]—Аптечное Дело [*Aptechnoe Delo*], **8**, 5, pp. 27–30, 1959.

Determination in 1948–51 of the alkaloid content in *Claviceps purpurea* [cf. above] collected mainly in the Moscow region from various wild and cultivated cereals showed it to be very high in ergot from perennial rye and wheat vars. in the Stavropol' perennial test field in 1949, especially no. 35 hybrid (hard wheat × perennial rye, total alkaloids, determined micrometrically, 0·31%), no. 36 hybrid (wheat Hostianum 237 × perennial rye, 0·448%), and Alabazskaya soft wheat × perennial rye (0·315%). The higher alkaloid from these hybrids than from rye in a number of other areas must probably be attributed to different races of the fungus, disseminated mainly in the E., SE., and S. of the country. There was considerable variation in the alkaloid content of ergots from wild grasses, e.g. from *Alopecurus pratensis* (0·55%), *Dactylis glomerata* (0·59%), *Festuca rubra* (0·418%), and *Elymus arenarius* (0·29%). There was also considerable variation in specimens from the same host, but from different sites.

Heyne (E. G.). **Registration of improved Wheat vars. XXIII.**—*Agron. J.*, **51**, 11, pp. 689–692, 1959.

The 14 vars. described [**38**, 250] include Burt (Reg. No. 375), a hard, white, winter wheat, developed by Wash. agric. Exp. Sta., highly resistant to all races of common and dwarf smut [bunt: *Tilletia caries*, *T. foetida*, and *T. contraversa*, respectively]; Omar (No. 377), a white, club, winter wheat (also from Wash.), resistant to all known races of these fungi, except race T18; Lemhi 53 (No. 380), a soft, white, spring wheat (Idaho agric. Exp. Sta.), resistant to races 38 and 56 of stem rust [*Puccinia graminis*] and moderately resistant to race 17, expected to replace Lemhi where stem rust is important; Russell (No. 382) a hard, red, spring wheat (Wis. agric. Exp. Sta.), resistant to powdery mildew [*Erysiphe graminis*] and loose smut [*Ustilago nuda*], moderately resistant to race 15B and some other stem rust races under Wisconsin field conditions, and moderately susceptible to bunt [*Tilletia caries*] and leaf rust [*Puccinia recondita*]; Langdon (No. 385), a high quality durum wheat (N. Dak. agric. Exp. Sta.), resistant to race 15B of stem rust, though more susceptible than Mindum to leaf rust; and the N. Dak. Ramsey (No. 387), a durum var., also resistant to race 15B, deriving stem rust resistance from Carleton.

Basile (Rita). **Relazione quinquennale (1953–1957) sulle razze fisiologiche di Puccinia graminis var. tritici in Italia.** [Five-yearly report (1953–1957) on the physiologic races of *P. graminis* f.sp. *tritici* in Italy.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **16** (*1958*), 2, pp. 109–119, 1 map, 1959. [Engl. summ. 23 ref.]

In Italy a total of 434 isolates of *P. graminis* f.sp. *tritici*, representing 95 physiologic races, was identified from 1953–5, inclusive [**39**, 163]; 395 isolates (90 races) were obtained from wheat and 35 (14 races) from barberry, all from Italy [loc. cit.]; the remaining 4 isolates (4 races) came from Algeria and Greece [loc. cit.]. Race 294, first isolated in Italy in 1955 in Tuscany, was found there again in 1956. The distribution of the races in Italy during the period is mapped and fully discussed.

Mohamed (H. A.). **Comparison of the pathogenicity of races 49 and 139 of Puccinia graminis var. tritici.**—*Egypt. J. Bot.*, **2**, 1, pp. 29–48, 1959. [19 ref. Arabic summ.]

The results of these studies at Univ. Minn. have been noted [**36**, 390].

Underwood (J. F.), Kingsolver (C. H.), Peet (C. E.), & Bromfield (K. R.). **Epidemiology of stem rust of Wheat. III. Measurements of increase and spread.**

Bromfield (K. R.), Underwood (J. F.), Peet (C. E.), Grissinger (E. H.), & Kingsolver (C. H.). **IV. The use of rods as spore collecting devices in a study on the dissemination of stem rust of Wheat uredospores.**—*Plant Dis. Reptr*, **43**, 11, pp. 1154–1159, 3 graphs; pp. 1160–1168, 1 fig., 2 graphs, 1959.

In further studies at Fort Detrick, Frederick, Md [cf. **39**, 163], an experiment was designed to provide data on the spread of *Puccinia graminis* on Knox winter wheat in natural conditions. A central $\frac{1}{4}$-acre plot was inoculated as a spore source for peripheral plots on radii at the 8 principal points of the compass, at 900 and 1,800 ft. from the centre, with a plot at 2,700 ft. in the direction of the prevailing wind. Flecking in the central plot was noted on 2 May, 9 days after inoculation. Rate of intensification of rust, which was exponential within the plots, and rate of spread, both of which are detailed, were dependent on wind direction and the prevailing meteorological conditions.

Stainless steel rods 1·6 mm. diam. and 13 cm. long with one end inserted in a cork bung were coated with an adhesive (2 gelatin: 7 glycerine: 6 water: 1% phenol), protected in a test tube, and then exposed by fixing into a hole in a wooden plate on an inverted flower pot [cf. **31**, 251]. Trapped spores of *P. graminis* were removed from a 2-cm. length of the rod by rolling it (min. 4 revolutions) against Scotch tape, to which the spores adhered, an area of approx. 100 sq. mm. thus being sampled. Tape+spores, stained with lactophenol cotton blue, was stuck to a slide and a spore count made. Spores were also trapped on silicone glass slides; also pustules were counted on potted Baart wheat seedlings 10 days after exposure to infection. The hours when most spores were trapped were 11 a.m. to 3 p.m. when winds were usually highest and humidity lowest. The coated rod method gave a better correlation with pustule development than the glass slides, but it is suggested that suitable protection of the rods from rain would be advantageous.

Petersen (L. J.). **Relations between inoculum density and infection of Wheat by uredospores of Puccinia graminis var. tritici.**—*Phytopathology*, **49**, 9, pp. 607–614, 6 fig., 4 graphs, 1959.

At Colo. State Univ., Fort Collins, uniform, reproducible inoculations of 10-day-old Little Club wheat seedling leaves with spores of race 15B were carried out in a 6-ft. high settling tower with an inner incubation chamber at its base (both described in detail), within which uniform temps. were maintained. The seedlings were placed on a platform in the incubation chamber and maintained at 74±1·5° F. and 100% R.H. Uredospores were injected into a globe at the top of the tower under controlled air pressure, time of exposure being controlled by movable slides at top and bottom of the tower. All uredospores fell as individual units after a pre-settling time of 6 sec. and were deposited on the leaves after a fall-out of 3½ min. Germ tube and appressoria counts were made from cellulose acetate epidermal impressions [**36**, 311] on 1 leaf 24 hr. after inoculation; the seedlings were then incubated for 4 days in the greenhouse, when a 2nd leaf was stained (Bell, *Phytopathology*, **41**, 1, p. 3, 1951) to observe infection foci. Chloronemic flecks were counted after 7 days and uredia after 12.

As inoculum density increased the number of uredia/sq. cm. leaf surface increased linearly to a max. of 0·7/100 viable uredospores. The infection response curve was, however, somewhat bimodal in that at inoculum densities of $2–4 \times 10^3$ viable uredospores/sq. cm. uredia differed little in number, but increased 2-fold at $4–5{\cdot}2 \times 10^3$, further increases in density having no effect. Individual chlorotic flecks did not represent single infection points, but contained numerous foci. At the lowest

inoculum density (920 spores/sq. cm.) 140 infection foci produced 5·6 chloronemic areas and 3·7 uredia sq. cm. The type 4 reaction [cf. **24**, 272] from low inoculum densities tended to assume the characteristics of the less susceptible type of reaction from high inoculum densities.

Joshi (L. M.) & Prasada (R.). **Seedling and adult plant reactions of Wheat variety Ridley to stem rust.**—*Indian Phytopath.*, **12**, 1, pp. 8–12, 1 fig., 1959.

At the Division of Mycol. and Plant Path., New Delhi, uredospores of *Puccinia graminis* [**38**, 588] were dusted (+talc 1:200) on to Ridley plants, resistant in the 1st leaf stage to races 15, 21, 21-A, 40, 75, 117, and 194. The leaves of mature plants were resistant to races 15, 21, 21-A, 40, and 117 and gave inconclusive results with races 75 and 194 but the stem (especially above the nodes), leaf-sheath, and awns developed a long, coalescent, susceptible type pustule with all these races.

Kasting (R.), McGinnis (A. J.), & Broadfoot (W. C.). **Biosynthesis of some amino-acids from sucrose by germinating uredospores of Wheat stem rust, race 15B.**—*Nature, Lond.*, **184**, 4703, p. 1943, 1959.

Germinating uredospores of *Puccinia graminis tritici*, race 15B, were demonstrated at the Canada agric. Res. Sta., Lethbridge, Alta, to synthesize at least 11 amino acids from uniformly labelled sucrose $-C^{14}$ [cf. **38**, 194, 684]. Thus it seems unlikely that amino acids are limiting factors in resistant wheat vars.

Watson (I. A.) & Luig (N. H.). **Somatic hybridization between Puccinia graminis var. tritici and Puccinia graminis var. secalis.**—*Proc. Linn. Soc. N.S.W.*, **84**, 2 (390), pp. 207–208, 1959.

In the greenhouse at Univ. Sydney, using a crossing procedure already described [**37**, 30], 2 different somatic hybrids between single-spore cultures of red *P. g.* f.sp. *secalis* (Accession No. 57241) and orange *P.g.* f.sp. *tritici* NR-2 [**38**, 76] were obtained. Their pathogenic properties are a combination of those of the parental strains. It is suggested that somatic hybridization between the 2 vars. may play a role in the origin of new strains of wheat stem rust in the field [**38**, 197].

Lelley (J.). **Adatok egyes magyar őszi Búzafajták és keresztezési származékok levélrozsda rezisztenciájáról.** [Data concerning resistance of some Hungarian vars. and hybrid populations of winter Wheat to the leaf rust.]—*Növénytermelés*, **8**, 4, pp. 315–324, 2 fig., 1959. [Russ., Engl., Germ. summ.]

The continuous spread of leaf rust (*Puccinia triticina*) [*P. recondita*] in Hungary since 1955, culminating in an epidemic in 1958, is noted from the Agric. Res. Inst., Kumpolt. The spread of race R1 (20) was followed latterly by that of R2 (77), owing to the extreme susceptibility to R2 of the widely grown winter wheat Fertödi 293, despite its resistance to R1 [cf. **33**, 716 and below]. The field resistance of F. 481 × *Triticum timopheeri* × F. 481 and Bánkúti 1201 × Gurka Krasznaja to both races was confirmed in the greenhouse.

Bócsa (Ivánné [= Eva]). **A Búza szár- és levélrozsda fiziológiai specializálódása Magyarországon 1956-ban.** [Physiological specialization of stem and leaf rusts on Wheat in Hungary in 1956.]—*Növénytermelés*, **8**, 4, pp. 325–332, 2 maps, 1959. [28 ref. Russ., Engl., Germ. summ.]

Some of this information from the agric. Res. Inst., Kumpolt, on *Puccinia graminis* has been noticed [**37**, 766], though in the summary of the present paper the predominance of the races is given as 21 (76%), 40 (16%), and 14 (8%). None was confined to a particular area. Leaf rust (*P. recondita*) [see above] occurred as races 20 (79%) and 77 (21%), the latter now spreading rapidly in W. Hungary.

Geshele (É.). Борьба с пыльной головней. [The control of loose smut.]—Сел. Хоз. Сибири [*Sel. Khoz. Sibiri*], *1959*, 6, pp. 29–30, 1959.

The Siberian Grain sci. res. Inst. recommends as immune from loose smut [*Ustilago nuda*: **38**, 194] Caesium 94 wheat, 2 numbers of wheat-grass hybrids, and Irtȳshanka 1, in the last of which there were no infected ears under inoculation. Among the Slavgorod Station vars. Slavgorodskaya 6 is highly resistant. Hard wheat vars. also appear resistant. In W. Siberia, however, in addition to the biological form of the smut which strongly infects soft wheats, there is also a form which attacks hard wheats, bearded wheats, and their hybrids. Caesium 94 (a hybrid of soft and bearded wheat) in the Odessa and Omsk regions is attacked by the form specific to it. Among the recommended control measures based on tests over 12 yr. winter sowing on the best farms, seed grading, hot air treatment, treatment in hot water with added granosan, or dry dusting of heat dried seed, and good culture are advocated. Formalin solution or dry treatment with granosan is best for oats. Other recommendations are made.

Storchevoĭ (A. L.). Нужны сорта Пшеницы, устойчивые против карликовой головни. [The need for Wheat varieties resistant to dwarf bunt.]—*Sel. Seed-Gr., Moscow*, **24**, 5, pp. 63–64, 2 fig., 1959.

According to observations made at the Selection Res. Sta., Stavropol', U.S.S.R., in 1958, the vars. most resistant to dwarf bunt (*Tilletia contraversa*) [**38**, 361: map 297] were Odesskaya 3 with 0·3% incidence, Hybrid 1495, 0·7%, Stavropol'skaya 1553, 0·7%, Hybrid 481, 3·4%, Odesskaya 16, 4·1%, Hybrid 491, 4·2%, L-3, 4·3%, and Hybrid 1494, 4·6%, compared with 32–45% for the more susceptible vars. Stavropol'skaya 1553 deserves special mention for its simultaneous high resistance to hard bunt (*T. tritici* [*T. caries*: **38**, 686] and *T. levis* [*T. foetida*: cf. **37**, 582]), figuring at 6% and 7·4%, respectively, other tested vars. rating 31–87%.

Nalĭyeva (Mme M. A.). Кубрәләрин пајызлыг Буғданын көкүсту зонасындакы көбәләкләрин инкишафына вә тәркибинә тә'сири. [The influence of manures on the development of fungi and their populations in the root zone of winter Wheat.]—Изв. Акад. Наук Азерб. ССР [*Izv. Akad. Nauk Azerb. S.S.R.*], Ser. biol. agric. Sci., *1958*, 1, pp. 111–117, 1958. [Azeri with Russian summary: 14 ref.]

In test plots in 1956 at the Experimental Base of the Inst. Genet., Leninskie Gorki, the predominating fungi in the root zones of winter wheat belonged to the genera *Alternaria*, *Fusarium*, *Trichoderma*, *Penicillium*, *Mucor*, and *Cladosporium*. The addition of lime stimulated the growth of spp. of *Trichoderma* (35%) and *Penicillium* (17%). *Cephalosporium* occurred only in the lime plots. With a humus and organo-mineral mixture, *Alternaria*, *Trichoderma*, *Fusarium*, *Mucor*, and *Penicillium* spp. prevailed. The number of aspergilli also increased. Mineral fertilizers promoted the development of *Penicillium*, *Dematium*, and *Fusarium*.

Smith (H. C.). **Yellow dwarf virus of Wheat.** —*N.Z. Wheat Rev.*, *1956–58*, 7, pp. 51–56, 4 fig. [Received Sept. 1959.]

Cereal [barley] yellow dwarf virus was found in preliminary surveys to be widespread throughout New Zealand [**35**, 236]. In 1953–4 and 1957–8 the av. reductions in yield in spring wheat, oats, and barley at Lincoln were 52·2, 49·7, and 28·7%, respectively. During 1954–56 few wheat crops in Canterbury had more than 5% infection, but in 1957 incidence in many was over 20%. Even with heavy infection, however, losses were not spectacular; thus 2 paddocks of Aotea wheat with 50% infection yielded 60 and 80 bush./acre.

The most easily recognized symptoms are the 'red-leaf' and 'blast' of oats.

Reaction of wheat varies with age: on seedlings, especially those inoculated in the glasshouse, the most reliable symptom is 'cut-leaf'. A leaf yellowing of most vars. is most pronounced when the wheat is in ear, when the uneven height of the heads above ground is also apparent. In 1957–8 infection by *Cladosporium* and *Fusarium* spp. was most severe on plants infected previously by yellow dwarf virus.

In glasshouse inoculation tests with *Rhopalosiphum padi* as vector the wheat vars. Cross 7, Tainui, Hilgendorf, Solid Straw Tuscan, Hunters, Dreadnought, Yielder, and Fife-Tuscan proved susceptible. Infection was also found at Lincoln on the commercially grown, local vars. Arawa, Aotea, and Gato, and on many others from overseas.

Brakke (M. K.). **Dispersion of aggregated Barley stripe mosaic virus by detergents.**—*Virology*, **9**, 4, pp. 506–521, 2 fig., 1959.

At the Plant Path. Dept, Univ. Neb., unpurified barley stripe mosaic virus [cf. **38**, 72] aggregated in 1 hr. at 40° C. Several detergents, of which the most effective was igepon T-73 (active ingredient *N*-methyl *N*-oleolyl taurate) dispersed these aggregates. Incorporation of 1% detergent in the diluent used in infectivity assays had no effect on the virus titre in 4 out of 7 tests, but in the remaining 3 it lowered the titre to $\frac{1}{4}$ that in the controls. The dispersive effectiveness of igepon T-73 varied according to the buffer used.

Miyamoto (Y.). **Studies on soil-borne cereal mosaics. IV. On the Barley yellow-mosaic virus. (Part 2).**—*Ann. phytopath. Soc. Japan*, **23**, 4, pp. 199–206, 1958. [Jap. Abs. from Engl. summ. Received Nov. 1959.]

Further studies at Hyogo Univ. Agric., Sasayama, showed that barley yellow mosaic virus [**38**, 139], believed to be found only in Japan, attacks most foreign vars. of barley to varying degrees. The hulled vars. are more susceptible than the hull-less, the 2-row barleys particularly so. The severity of infection is influenced by environmental conditions. *Hordeum agrioerithon* and *H. spontaneum* are susceptible, and cells of the diseased plants contain X-bodies. Resistance occurs in the linkage test groups I and VI, but not in II–V or VII. The difference in infection rates between pregerminated and normally sown seeds [loc. cit.] was enhanced in conditions unfavourable for virus infection. The infection rate of the virus dry-stored at 0–2° C. for 1 month and then at 5–10° for about 2 yr. was $\frac{1}{3}$ of that of the fresh virus.

Joshi (L. M.), Misra (D. P.), Sreekantiah (K. R.), Lele (V. C.), & Kak (D.). **Studies in Puccinia hordei Otth., the leaf rust of Barley, in India.**—*Indian Phytopath.*, **12**, 1, pp. 69–75, 1959.

The opt. temp. range for germination of *P. hordei* determined at the Indian agric. Res. Inst., New Delhi, is 16–18° C. Uredospores remain viable up to 9 months if stored at 0–5°, and up to 4 months at 9–14° (room temp.). Studies of 5 collections from the States of Delhi, Uttar Pradesh, and Madras [**39**, 73] showed that the Indian race is closely related to race 2 [cf. **34**, 31] and that it has a biotype. Of 48 cereal and grass spp. (24 genera) tested with the 2 forms of *P. hordei*, 5 spp. of *Hordeum* and 7 spp. of *Aegilops* were infected.

Andersen (A. H.) & Lund (S.). **An investigation of the presence of a morphologic indicator of loose-smut infected Barley seedlings.** *Plant Dis. Reptr*, **43**, 10, pp. 1122–1123, 1 fig., 1959.

At N.J. agric. Exp. Sta., New Brunswick, seedlings of 20 barley vars. were inoculated in the greenhouse with *Ustilago nuda*. Only Weibull's 5425 consistently produced shortened leaf-sheaths [cf. **35**, 290].

Reed (H. E.). **Studies of Rhynchosporium secalis (Oud.) Davis causing scald of Barley.**—*Diss. Abstr.*, **20**, 1, p. 49, 1959.

This fungus has now become widespread and destructive in a number of barley-growing regions of N. America [cf. **36**, 394; **39**, 165], where it was not previously epiphytotic. It affects the foliage primarily, but conidia have been obtained from severely stunted heads in the absence of characteristic leaf symptoms. In East Tennessee 100% mortality has been recorded in some fields of susceptible vars. in Feb. and Mar., and yield losses are as high as 95% in other vars.

At the Ohio State Univ. 10 isolates from distant parts of the U.S.A. [loc. cit.] and Canada were found to vary considerably in sporulation, pigmentation, and topography in culture, but to be almost uniform in their rate of growth on potato dextrose agar. Best growth of all isolates was obtained on this medium at pH 5·2 at 19° C. Differences of growth on other media were thought to indicate the existence of different enzyme systems, which might affect the pathogenicity of the isolates. Sector variants (mutants), 14 of which differed greatly from their parent cultures and from each other in cultural characters, proved to be non-pathogenic or only weakly pathogenic on 4 barley vars. in the greenhouse. Comparison of the field susceptibility of 117 vars. at Knoxville, Tennessee, with their reported susceptibility elsewhere revealed considerable differences in the performance of over 25% at any 2 places. The greatest differences in varietal susceptibility were found in the observations for Knoxville and Argentina.

Greenhouse ratings of 24 barley vars., using 20 monoconidial cultures from barley in various regions of the U.S.A. and Canada, agreed generally with those in the field. By use of 7 vars. 16 physiological races could be differentiated among the 20 isolates.

The fungus seemed to survive from one season to the next on plant refuse along fence rows and plot borders, probably as stromata. Scald-infected plant refuse failed to produce inoculum the 2nd season in the field or after 20 months at 5° C. Thus a 1-yr. rotation of barley with some other crop would help to check the disease in Tennessee if no inoculum were introduced from outside. Primary inoculum may come from small fragments of diseased leaves mixed in with seed and left exposed at the ends of drill rows. In field tests 84% of 150 barley breeding selections and 86% of their parent lines were susceptible.

Skoropad (W. P.). **Seed and seedling infection of Barley by Rhynchosporium secalis.**—*Phytopathology*, **49**, 10, pp. 623–626, 7 fig., 1959.

In studies at Edmonton, Canada, selection of seed infected by *R. secalis* [**38**, 385 and above] from samples of threshed barley was facilitated by wetting the seed, which rendered lesions much more conspicuous. Infection most generally occurs when the kernel has filled more than half the space enclosed by the floral bracts, usually on the inside of the lemma immediately below the base of the awn. Conidia, in clusters indicating transmission in drops of water, were trapped most abundantly in the field during rainstorms. The floral bracts, pericarp, and awns, all readily infected, form sources of primary inoculum. Morphological features, including remains of floral parts and barbs on the lower surface of the lemma and upper surface of the pericarp, chiefly decide the location of lesions on the upper part of the grain. The coleoptile becomes inoculated as it grows past the underside of the lemma, the natural opening near the coleoptile tip trapping conidia and providing moisture. Some coleoptiles (12% in Moore and Gateway) erupt near the base of the grain, thus avoiding contact with a scald lesion and escaping infection. Low temps. and adequate moisture favour both seed germination and conidial production. High soil temps. inhibit conidial production and hasten coleoptile emergence, thus preventing infection at this stage. Depth of seeding has no effect.

Shih (S. C.), Elliott (E. S.), & Veatch (C.). **A study of Erysiphe graminis races on Barley in West Virginia.**—*Plant Dis. Reptr*, **43**, 12, pp. 1282–1283, 1959.

At the W. Va agric. Exp. Sta., Morgantown, 55 isolates of *E. graminis* [cf. **36**, 18; **39**, 164] from barley grown locally were classified in 8 races, including a new one designated race 22. Races 8 and 9 were prevalent.

Pollhamer (E.). **Mutációs kisérletek tavaszi Árpa nemesítésében II.** [Mutation experiments on spring Barley II.]—*Növénytermelés*, **7**, 1, pp. 11–26, 11 fig., 1958. [Russ., Engl. summ.]

The 98 mutants obtained in MFB 184 since 1953 at the agric. Res. Inst., Hungarian Acad. Sci., Martonvásár, were found to have characters of 8 barley vars. As some were resistant to powdery mildew [*Erysiphe graminis*: cf. **37**, 277; **38**, 78] it is the author's belief that the var. could be improved by further cross-breeding to develop greater resistance.

Rasmusson (D. C.) & Schaller (C. W.). **The inheritance of resistance in Barley to the yellow dwarf virus.**—*Agron. J.*, **51**, 11, pp. 661–664, 2 fig., 1959.

At the Univ. Calif., Davis, a gene (Yd_2) for resistance to barley yellow dwarf virus was demonstrated in the barley vars. C.I.1227, C.I.1237, C.I.2376, and Abate, conditioning a high level of tolerance, though incompletely dominant. The level of tolerance was such as to assure a fair grain yield under conditions inducing severe damage and failure to give seed in susceptible lines [cf. **36**, 754 and below]. The gene is not associated with 5 other agronomic characters tested.

The epidemic of Barley yellow dwarf on Oats in 1959. *Plant Dis. Reptr, Suppl.* 262, pp. 314–384, 12 fig., 1 graph, 4 maps, 1959. [142 ref.]

The incidence of the disease [cf. above and below] in 21 States of the U.S.A. and Canada [**39**, 165] and various aspects of its transmission, varietal reactions [cf. **38**, 255], effects on yield, and control are dealt with in 27 short papers and notes by 37 authors, accompanied by a bibliography.

Rochow (W. F.). **Transmission of strains of Barley yellow dwarf virus by two aphid species.**—*Phytopathology*, **49**, 11, pp. 744–748, 1959. [15 ref.]

A more detailed account from Dept Plant Path., Cornell Univ., Ithaca, N.Y., of tests on oats already noticed [**39**, 166].

Futrell (M. C.), Carero (M.), & Reyes (L.). **Landhafer races of crown rust on Oats in South Texas and northern Mexico in 1959.**—*Plant Dis. Reptr*, **43**, 11, pp. 1198–1200, 1959.

Three successive natural spore showers of crown rust [*Puccinia coronata*: **38**, 688] on oats at Rio Bravo, Mexico, shortly after emergence in weather conditions ideal for establishment of infection, resulted in the 1st epiphytotic of the rust in this area. The spread of the disease further northward in spring 1959 across Texas was checked by environmental factors.

Simons (M. D.). **Variability among strains of noncultivated species of Avena for reaction to races of the crown rust fungus.**—*Phytopathology*, **49**, 9, pp. 598–601, 1959.

In tests at Iowa State Coll., Ames, of 216 strs. of the main non-cultivated spp. of *Avena* for seedling reaction to various cultures of *Puccinia coronata* [f.sp.] *avenae* [cf. **36**, 314; **38**, 201; **39**, 102] and of 87 of them for reaction to 12 cultures representative of many races, 37 strs., covering 23 reaction patterns, had some resistance to at least 1 culture. A str. of *A. strigosa* [cf. below] and another of *A. abyssinica*

were resistant to all 12 and to many other cultures also; several strs. or groups of strs. resisted most of the 12. Race 264, with a wide host range on cultivated vars., behaved similarly to other races in its host range on non-cultivated strs. Additional types of resistance could probably be isolated quite easily. Field tests over 4 yr. indicated that certain strs. (C.I.2525, 2833, 3816, and 3222) of poor resistance as seedlings in the greenhouse had high field resistance.

Marshall (H. G.). **A cytogenetic study of certain interspecific Avena hybrids, and the inheritance of resistance in diploid and tetraploid varieties to races of crown and stem rust.**—*Diss. Abstr.*, **20**, 1, p. 19, 1959.

These studies at Univ. Minnesota indicated that the resistance of 6 vars. of *A. strigosa* (n = 7) to each of the races 276, 203, and 216 of crown rust [*Puccinia coronata*: cf. **37**, 406 and above], as determined from F_2 populations, was apparently conditioned, in most strs., by a completely or almost completely dominant gene or by 2 such independent genes. The diploid vars. may have a dominant gene for resistance to race 203, which also conditions resistance to 216 and 276, and sometimes the results could be explained by the presence of a 2nd factor for resistance to 216 or 276, linked with and hypostatic to the 1st.

The diploid vars. C.I.4639 (Saia) and C.I.4746 were resistant to races 7 and 8 of stem rust [*Puccinia graminis*: cf. **35**, 10], but resistance could not be determined from the F_2.

Resistance to races 276 and 203 of crown rust in a var. of *A. abyssinica* was apparently conditioned by a partially dominant gene and that to race 216 by a recessive gene. Only 2 out of 16 F_2, BC_1, and BC_2 individuals resulting from the autotetraploid *A. strigosa* × *A. sativa* cross were found to lack the crown rust resistance of the *strigosa* parent.

Rivers (G. W.). **Inheritance of resistance to Helminthosporium blight, crown rust race 216, and stem rust race 7A in Oats.**—*Agron. J.*, **51**, 10, pp. 601–603, 1959.

In this co-operative study in semi-controlled conditions in the greenhouse at the Texas agric. Exp. Sta. and the Crops Res. Div., U.S.D.A., it was found that resistance to *H. victoriae* [**36**, 19; **37**, 656] in the oat cross II–47–4 × 145 -44–43 was controlled by a single pair of recessive genes and resistance to race 216 of crown rust (*Puccinia coronata*) [**35**, 601] by a single pair of genes with susceptibility dominant. Some F_3 lines, resistant to both pathogens, were grown to maturity and continued in the oat breeding programme. Resistance to *P. graminis* race 7A [**39**, 102] in Bronco × Garry was conditioned by a single dominant gene.

Earhart (R. W.). **The differentiation of pathogenic forms of Eu-Helminthosporium species which attack Oats.**—*Plant Dis. Reptr*, **43**, 11, pp. 1184–1187, 1959.

At Clemson agric. Coll., S. Carol., 10-day-old seedlings of Victorgrain 48–93 and Arlington oat vars. [**38**, 739], moderately susceptible to Victoria blight (*H. victoriae*) [**38**, 202] and with typical resistance to certain races of crown rust [*Puccinia coronata*: **38**, 255], and Midsouth and Southland, considered resistant to *H. victoriae* and susceptible to the crown rust races, were placed in test tubes containing suspensions of macerates of 54 *Eu-Helminthosporium* [**8**, 529] isolates from sub-crown areas of infected and healthy oat plants and from soil. After 24 hr. the seedlings were assigned, on their appearance, to 1 of 6 classes, ranging from 'rotted' (local necrosis of culm and leaf sheath) and 'blighted' (death of leaf blades, usually + darkening of tissues) to 'unaffected'. Host response to mycelium macerates appeared essentially similar to that from toxin filtrates [see below], and the results indicated that the fungi present could be classified in 2 groups: the largest (94·4% of the isolates) included those which incite Victoria blight (*H. victoriae* and allied forms), the remainder those which incite culm rot of Southland oats [**30**, 408].

Johnston (Peggy D. S.). **Toxins associated with Helminthosporium blight of Oats.** —*Diss. Abstr.*, **20**, 1, p. 43, 1959.

In extracts of Victorgrain oats infected by *H. victoriae* at Louisiana State Univ. a toxin similar to victorin [**39**, 167] and a non-specific one were demonstrable by their inhibitory action on the root growth of seedlings of Victorgrain oats and camellia; the former toxin was specific to Victorgrain. These toxins were not present during summer and early autumn. Another toxin was consistently present in both healthy and infected plants.

A total of 3,600 Victorgrain and 3,450 Arlington seedlings were screened with victorin in an attempt to obtain seedlings with an intermediate reaction to *Helminthosporium* blight [cf. **37**, 656 and above]; 37 of the former and 100 of the latter were selected. Most of them were susceptible to crown rust [*Puccinia coronata*]. In the next generation only 2 of the Arlington seedlings continued to show an intermediate reaction. It is possible that a complex locus controls reactions to the 2 fungi.

Grasso (V.). **Formazione di pseudospore di Ustilago kolleri su acqua agarizzata.** [The formation of pseudospores of *U. kolleri* on water agar.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **16** (*1958*), 2, pp. 147–154, 2 pl. (8 fig.), 1959. [Engl. summ. 16 ref.]

In further studies on the genetics of oat smuts (*U. kolleri* [*U. hordei*] and *U. avenae*) [cf. **37**, 717] the author, to eliminate any possible effect of hybridization, combined a strain of *U. hordei* from Parma with another from Rome, which had previously behaved normally, with 2 sexual groups. When lines of sporidia, compatible or not, were paired on water agar, small, round haploid bodies with a thick, well-defined wall (pseudospores) formed.

Slavnina (Mme T. P.), Potekhina (Mme L. I.), Kuznetsova (Mme Z. D.), & Simonova (Mme E. I.). Особенности ризосферной почвы озимой Ржи и Овса на темно-серой и серой лесных почвах. [Characteristics of the rhizospheres of winter Rye and Oats in dark-grey and grey forest soils.]—Науч. Докл. высш. Школ. [*Nauch. Dokl. vŷssh. Shkol.*], Biol. Sci., *1958*, 4, pp. 190–198, 1959.

Observations at the agric. Res. Sta., Tomsk, U.S.S.R., showed that 'ammonificators', such as *Bacillus mycoides* [cf. **34**, 254], were generally more abundant within the rhizosphere [cf. **28**, 141] than outside, while the distribution of the 'decomposers' of the non-N-containing organic matter and of cellulose was indiscriminate and variable.

Among the cellulose destroyers *Sorangium cellulosum* was the chief representative of the myxobacteria and *Trichoderma* [**37**, 265] of the fungi; *Micromucor* and *Monotospora* occurred less frequently and were capable of decomposing cellulose only to a limited extent.

Pavgi (M. S.) & Flangas (A. L.). **Occurrence of southern Corn rust in Wisconsin.** —*Plant Dis. Reptr*, **43**, 12, pp. 1239–1240, 3 fig., 1959.

The 1st occurrence in the State of *Puccinia polyspora* on maize [cf. **37**, 525; map 237] is reported from Univ. Wis., Madison.

Gorlenko (M. V.) & Glushenkova (Mme T. I.). К биологии возбудителя пузырчатой головни **(Ustilago zeae (Beckm.) Unger).** [On the biology of the causal agent of blister smut (*U. maydis*).]—Науч. Докл. высш. Школ. [*Nauch. Dokl. vŷssh. Shkol.*], Biol. Sci., *1958*, 3, pp. 106–109, 2 fig., 1958.

At Moscow Univ. chlamydospores of *U. maydis* [**38**, 513] were found not to germinate in soil, though they were still 80% viable when retrieved from the soil after

2 months and 60% after 11 months. Chlamydospores of *Tilletia tritici* [*T. caries*] and *U. crameri* [**37**, 720], on the other hand, germinated in the soil within a week, formed basidiospores, and then degenerated. This dormancy of chlamydospores of *U. maydis* enables them to infect maize plants throughout the whole growth period. For soil disinfection positive results were obtained with NH_4NO_3, though these need to be checked. Anatomical study of infected plants from the Moscow region and Krasnodar area showed that infection of individual plant organs is most frequently the result of local infection, rather than the consequence of soil or seed infection.

Sosnina (Mme M. A.) & Beglyarova (Mme L. S.). О восприимчивости Кукурузы к пузырчатой головне. [On the susceptibility of Maize to blister smut.]—Кукуруза [*Kukuruza*], **4**, 10, pp. 30–31, 1959.

In plots at the Uzbek agric. Inst. training farm and the Samarkand breeding fields in 1956–7 hybrid Pioneer 388 'a', VIR 156, and Krasnodarskiĭ 5 were most resistant to blister smut [*Ustilago maydis*: cf. **39**, 23] and also gave the best yields. 86·8, 72·4, and 78·7 centners/ha. respectively. Infection depends on the agroecological conditions of cultivation and the degree of infection on the time factor [cf. above].

Nelson (R. R.). **Cochliobolus carbonum, the perfect stage of Helminthosporium carbonum.**—*Phytopathology*, **49**, 12, pp. 807–810, 5 fig., 1959. [10 ref.]

At N. Carol. State Coll., Raleigh, perithecia were obtained by pairing mycelial isolates of *H. carbonum* from maize on opposite sides of sections of sterile maize leaf on Sach's agar at pH 4 and 24° C.; they first appeared in 5–6 days, and mature spores were generally present in 22 days. The perfect state is described as *C. carbonum* Nelson; perithecia are ellipsoidal-globose, 355–550 × 320–430 μ with a beak 60–200 μ long, asci 162–257 × 18·2–27·4 (196·6 × 22·6) μ, and ascospores 182–306·4 × 6·4–9·6 (245·4 × 7·8) μ with 5–9 septa. Conidial and ascospore isolates fell more or less equally into 2 mating groups, though no isolate was completely intergroup fertile. Inconsistent behaviour of paired compatible strs. indicates that several genes are involved in sexual reproduction. The production of these ascocarps and those of related spp. [**38**, 511] in culture only on solid substrates, generally plant parts, suggests the necessity of some physical requirement for the process, rather than nutritional.

Narita (T.) & Hiratsuka (Y.). **Studies on Kabatiella zeae n.sp., the causal fungus of a new leaf spot disease of Corn.**—*Ann. phytopath. Soc. Japan*, **24**, 3, pp. 147–153, 6 fig., 1959. [Jap. Abs. from Engl. summ.]

This fungus described from the Hokkaido Prefectural agric. Exp. Sta., and Faculty of Agric., Hokkaido Univ., Sapporo, attacks maize only, producing numerous round, brownish-grey spots, 1–3 mm. diam. with brown or brownish purple margins and a light yellow halo on leaf blades, leaf sheaths, or rarely, stems. The conidiophores were 10–15 × 4–6 μ and the conidia 16·2–47·5 × 2–3·5 (32·4 × 2·6) μ. The fungus is compared with 7 other *K.* spp.

Young (H. C.), Wilcoxson (R. D.), Whitehead (M. D.), Devay (J. E.), Grogan (C. O.), & Zuber (M. S.). **An ecological study of the pathogenicity of Diplodia maydis isolates inciting stalk rot of Corn.**—*Plant Dis. Reptr*, **43**, 10, pp. 1124–1129, 1 graph, 1959.

Isolates of *D. maydis* [cf. **37**, 39] and certain maize single crosses were exchanged between Minn., Mo., and Okla for inoculation in each State during 1954, –55, and –57. The isolates were generally most pathogenic in the States of origin, but in 1955 in Minn., when the growing season was unusually dry and hot, the Mo. and Okla isolates caused more stalk rot than did the native one. All isolates in all tests

were more pathogenic in Okla and Mo. than in Minn. This variable pathogenicity appeared to be related to the temp. requirements of the isolates, as shown by radial growth on potato dextrose agar; thus the isolate from Minn., where the growing season is usually cool and moist, developed best at 25° C., but the other 2 grew better at higher temps.

Hoppe (P. E.). **Pythium species still living in muck soil air-dried six years.**—*Phytopathology*, **49**, 12, pp. 830–831, 1 fig., 1959.

At Univ. Wis., Madison, the soil was saturated with distilled water for 0–30 days and used in comparison with recently collected similar soil for rolled-towel germination tests of maize seed [**35**. 444] wounded at the crown. Seed treated with captan germinated well in both soils. Untreated seed in the 'normal' soil developed 100% rot. In the dried soil wetted for 0 or 2 days little or no disease appeared; after 5, 8, 10, and 15 days' wetting germination was 81, 77, 14, and 1%, respectively. *Pythium* spp. are considered the principal incitants of the rot.

Grogan (C. O.), Zuber (M. S.), Brown (H. E.), Whitehead (M. D.), & Stanway (V. M.). **Effect of fungicides and insecticides on the germination of Corn after storage.**—*Plant Dis. Reptr.* **43**, 10, pp. 1132–1137, 2 graphs, 1959.

The results of cold and standard germination tests at Univ. Mo. agric. Exp. Sta. immediately after application of fungicides and insecticides showed little or no correlation with those of subsequent tests 3, 6, 12, and 18 months later, though percentages at 3 months were generally highly correlated with those of later dates. Fungicides applied by the slurry method did not decrease germination appreciably until 6 months after treatment, and germination improved within 18 months. Insecticides reduced germination rapidly until 6 months after treatment and there was little sign of recovery, indicating a permanent phytotoxic effect. Treatment with insecticide-fungicide combinations gave better germination than with insecticides alone and the results were further improved by the use of an adherent. Aldrin appeared to have some fungicidal properties.

Shelonina (Mme I. M.). Некоторые особенности развития микориз Кукурузы сорта Воронежская 76 в условиях Воронежской области. Сообщ. 1. Влияние гранулированных органо-минеральных удобрений на микоризообразовательный процесс Кукурузы сорта Воронежская 76 в условиях Воронежской области. Сообщ. 2. [Some characteristics of the development of mycorrhiza in the Maize var. Voronezhskaya 76 in the conditions of the Voronezh region. Report 1. The effect of granulated organo-mineral fertilizers on the process of mycorrhiza formation by the Maize var. Voronezhskaya 76 in the conditions of the Voronezh region. Report 2.]—Изв. Воронежск. гос. пед. Ин-та [*Izv. Voronezhsk. gos. ped. In-ta*], *1958*, 24, pp. 283–292, 293–301, 1958. [Abs. in *Referat. Zh. Biol.*, *1959*, 19, p. 118, 1959.]

Mycorrhiza [**38**, 366 and below] in Voronezhskaya 76 are endotrophic. Infection is through the root hairs or epidermal cells. The hyphae are either very thick and septate, sometimes turning brown, or finer, hyaline, and non-septate. At the beginning of tillering the fungus spreads on the seminal roots and later on to the adventitious roots and their laterals. The non-septate mycelium forms vesicles (in all types of roots) and arbuscles (in seminal and secondary roots at full flowering and maturity). Hyphal lysis starts at tillering and continues throughout the growing period. Development is more intensive with less soil sediment and a higher temp., and also with addition to the soil of N, P, and K in the form of granulated organo-mineral mixtures.

Shelonina (Mme I. M.). Влияние бактериальных удобрений на процесс микоризообразования Кукурузы. [Effect of bacterial fertilizers on the process of mycorrhiza formation in Maize.]—Кукуруза [*Kukuruza*], **4**, 11, pp. 42–43, 1959.

Further investigation at Voronezh agric. Inst., U.S.S.R., in 1955–57 [see above] showed that bacterial ingredients enhance the development of stimulatory mycorrhiza on secondary more than on primary roots. The combination K_{30}+azotobacterin+phosphorobacterin [cf. **38**, 233, 253] gave the best increase of grain yield with $N_{30}K_{30}$+phosphorobacterin next.

Grist (D. H.). **Rice. Third Ed.**—xiv+466 pp., 4 col. pl., 68 fig., London, Longmans, Green & Co. Ltd., 1959. 42*s*. [569 ref.]

Chapter XV (pp. 265–288), dealing with the importance, symptoms, etiology, and control of diseases, is based largely on information contained in Dickson [**36**, 259] and Padwick [**30**, 488].

Misato (T.), Ishii (I.), Asakawa (M.), & Fukunaga (K.). **Antibiotics as protectant fungicides against Rice blast.**—*Ann. phytopath. Soc. Japan*, **23**, 5, pp. 219–224, 1 fig., 5 graphs, 1958. [Jap. Abs. from Engl. summ. Received Nov. 1959.]

At the National Inst. agric. Sci., Nishigahara, Kita-ku, Tokyo, spore germination and growth of 1-week-old mycelium of *Piricularia oryzae* were completely inhibited by antimycin A, blastmycin, and blasticidin [cf. **39**, 281] at 50–100 μg./ml.; lower concs. inhibited a 48-hr. growth. Antimycin A and blastmycin were stable and were still active after 2 weeks on the leaves, while blasticidin, stable in the dark, decomposed gradually in sunlight. The 3 antibiotics were resistant in simulated rain of approx. 10 mm./10 min.; they were effective protectant fungicides against *P. oryzae*, though not as good as phenyl mercuric acetate (PMA). The same number of leaf spots developed on plants treated with the 3 antibiotics and PMA, but the systemic effect of the antibiotics was inferior.

Nozu (M.). **Histochemical demonstrations of dehydrogenases in the Rice plant tissues affected by Cochliobolus miyabeanus and in the causal fungus.**—*Ann. phytopath. Soc. Japan*, **24**, 2, pp. 114–118, 14 fig., 1959. [Jap. Abs. from Engl. summ.]

At the Faculty of Agric., Nagoya Univ., Anzyo, Aichiken, dehydrogenase activity was detected with tetrazolium blue (BT) [cf. **37**, 482] in sections of healthy rice leaves after 2 hr. incubation at 32° C. and the rate of staining became constant after 8 hr.; none was demonstrated after treatment with formalin (10%, 1 hr.) or maintenance at 50–60° C. for 10 min. The sites of enzyme activity in leaves seemed to be the grana-like regions in the chloroplasts of parenchyma cells. When the lesion area on an infected leaf (1st appearing 20 hr. after inoculation) enlarged, the tissue round it stained with BT, but despite further enlargement of the lesion, the reaction became constant 48 hr. after inoculation. In a typical lesion 5–7 days old the localization and intensity of formazan deposition was indistinguishable from that in a healthy leaf. The BT reaction was weak in leaf sheath cells even when the pathogen had penetrated them, but was strong in penetrating hyphae, especially appresoria and germ tubes. In spores germinated on slides the reaction was detected in the terminal cells of the spores and the germ tubes as well as in appresoria: the reaction was apparently localized on the mitochondria of the fungus [cf. below].

Nozu (M.) & Matsui (C.). **The fine structure of conidia of Cochliobolus miyabeanus (Ito et Kurib.) Drechsler.**—*Ann. phytopath. Soc. Japan*, **24**, 3, pp. 135–138, 7 fig., 1959. [Jap. Engl. summ.]

Electron microscope photographs obtained at Nagoya Univ. are presented [cf. **39**, 169].

Oku (H.). **Biochemical studies on Cochliobolus miyabeanus. III. Some oxidising enzymes of the Rice plant and its parasites and their contribution to the formation of the lesions.**—*Ann. phytopath. Soc. Japan*, **23**, 4, pp. 169–175, 5 graphs, 1958. [Jap. Abs. from Engl. summ. Received Nov. 1959.]

In studies at Takamine Lab., Sankyo Co., Shinagawa, Tokyo, the increase of O uptake resulting from the introduction of cytochrome-*c* into the hydroquinone or *p*-phenylenediamine enzyme systems suggested the presence of cytochrome oxidase in rice, *C. miyabeanus*, and *Piricularia oryzae*. A high ascorbic acid oxidase activity was also encountered.

Activity of polyphenol oxidase, opt. at pH 8, was high in *C. miyabeanus* and low in rice and *P. oryzae*. This enzyme oxidized several plant polyphenols and was inhibited by diethyldithiocarbamate and KCN.

On media containing a number of polyphenols (e.g. chlorogenic acid or a crude polyphenol extract from rice plants) growth of *C. miyabeanus* was inhibited and brown pigmentation occurred. These results indicate that polyphenol oxidase in the pathogen plays an important part in the appearance of brown spots in leaf blights of rice caused by these fungi.

Akai (S.), Shishiyama (J.), & Egawa (H.). **Studies on pathological physiology of Rice plants. IV. On the susceptibility of Rice plants cultured with nutrient solution containing amino acid to the Helminthosporium blight caused by Cochliobolus miyabeanus.** *Ann. phytopath. Soc. Japan*, **23**, 4, pp. 165–168, 1958. [Jap. Abs. from Engl. summ. Received Nov. 1959.]

In further studies at Kyoto Univ. [cf. **36**, 724] the free amino acid content in rice plants increased when the plants were raised in nutrient solution with aspartic acid, cystine, glutamic acid, glycine, or $(NH_4)_2SO_4$ as the N source. Aspartic acid gave the max. increase, the other sources giving, in the above order, a progressively smaller amino acid content. Infection with *C. miyabeanus* reduced the free amino acid content of the leaves, especially the dibasic amino acids, measured 6 days after inoculation. The number of spots produced after inoculation was similar with amino acids and $(NH_4)_2SO_4$, but the spots were shorter where the amino acid content was less; this content appears to be to some extent correlated with susceptibility to the fungus.

Asada (Y.). **Studies on the susceptibility of akiochi (autumn declined) Rice plants to Helminthosporium blight. (V). On the influence of the carbon sources, the amount of amino acids and C-N ratio upon the secretion of the perthophytic enzymes of Cochliobolus miyabeanus. (VIII). Production of oxalic acid by the pathogenic fungus and decomposition of pectin.**—*Forsch. PflKr., Kyoto*, **6**, 3, pp. 109–113; pp. 114–116, 1 graph, 1959. [Jap. Abs. from Engl. summ.]

In further studies [**38**, 516] it was found that akiochi rice plants [**39**, 228] contained higher soluble N and C-N ratio (sucrose: KNO_3) than normal plants. *In vitro* on a medium abundant in amino acids [cf. above] and with a C-N ratio of 5, *C. miyabeanus* grew vigorously, activity of cellulase, xylanase, and pectic enzyme being high. Secretion of xylanase and pectic enzymes was higher when xylan or starch was used as C source instead of glucose. The secretion of these perthophytic enzymes was also stimulated in a medium prepared from a decoction of leaves of akiochi rice plants. It is suggested that since such plants contain more available soluble N than normal ones, they are more readily attacked by *C. miyabeanus* and are more tolerant of the fungal enzymes.

The secretion of oxalic acid, with resultant pectin decomposition, together with pectic enzymes, may cause the decomposition of the middle lamellae of parenchymatous cells. Early in culture depolymerase may be secreted, while polygalacturonase secretion follows later.

Chattopadhyay (S. B.) & Dasgupta (C.). **Helminthosporium rostratum Drechs. on Rice in India.**—*Plant Dis. Reptr*, **43**, 12, pp. 1241–1244, 23 fig., 1959.

The pathogen, found in West Bengal, India, caused oval leaf spots 2–3 × 1–1·5 mm., faint brown to straw colour. At the State agric. Res. Inst., Calcutta, 2 types of isolate were obtained, 1 typical and the other a morphological variant of *H. rostratum* [cf. **26**, 337; **37**, 78], both pathogenic to rice leaves, inducing typical spots.

Pálfi (G.). **A Rizs ásványi táplálkozásának összefüggése a betegségre való hajlammal.** [The relations between mineral nutrition of Rice and its susceptibility to diseases.]—*Növénytermelés*, **7**, 1, pp. 37–52, 1 fig., 4 graphs, 1958. [Russ., Engl. summ.]

Experiments at the Res. Inst. for Agric., Szeged, Hungary, showed that, in addition to unfavourable meteorological conditions, hard soil, and protracted flood periods, the susceptibility of rice to diseases including 'brusone' [cf. **37**, 282] was increased by excessive Na intake. High Na absorption at the expense of other elements may in its turn be a symptom of disease. Content of Ca in soil reduced uptake of Na salts, and Ca compounds added to saline soils never allowed a large-scale development of diseases. The application of KH_2PO_4 and especially $(NH_4)_2HPO_4$ to the leaves reduced the amount of absorbed Na by half.

Bajai (J.). **Az Early Hegari-n (Sorghum vulgare var. frumentaceum) tapasztalt megbetegedés.** [A new disease of Early Hegari Sorghum.]—*Növénytermelés*, **8**, 4, pp. 373–378, 7 fig., 1959. [Russ., Engl. summ.]

The agric. Res. Inst., Hungarian Acad. Sci., Martonvásár, records this sorghum, which was practically free from diseases until 1955, as having suffered since 1956 from a disease closely resembling foot rot caused by *Fusarium moniliforme* [*Gibberella fujikuroi*: cf. **30**, 518; **34**, 350; map 191], though the exact cause is not yet determined. Selection of resistant vars. is recommended.

Ramachandra-Reddy (T. K.). **Foliar spray of urea and rhizosphere microflora of Rice (Oryza sativa L.).**—*Phytopath. Z.*, **36**, 3, pp. 286–289, 1 fig., 1959.

At the Univ. Bot. Lab., Madras, India, MTU 9 rice seedlings, susceptible to foot rot (*Fusarium moniliforme*) [*Gibberella fujikuroi*: **36**, 422], were sprayed (twice or 5 times at 1-day intervals) when 3 weeks old with 30 ml. of an 0·1 M solution of urea+tween-80 as a spreading and wetting agent. There was a preferential stimulation of a *Penicillium* sp. with consequent reduction in bacteria and actinomycete flora in the rhizosphere. The significance of this finding is briefly discussed.

Fisher (E. E.) & Freeman (H.). **Plant diseases recorded in Victoria. Part I (Section 1).**—*J. Dep. Agric. Vict.*, **57**, 10, pp. 679–683, 1959.

This is a host index, this part covering citrus [cf. **21**, 472], the host spp. being arranged alphabetically. The diseases are grouped under fungi, bacteria, viruses, and nutritional and other disorders. Some items of unrecorded information have been obtained from the Department. In addition to the records already noticed in this *Review* citrus exocortis [map 291] and tristeza [map 289] viruses on orange are included.

Grant (T. J.). **Tristeza virus strains in relation to different Citrus species used as test plants.**—*Phytopathology*, **49**, 12, pp. 823–827, 1 fig., 1959. [15 ref.]

In further studies at the U.S. Dept Agric., Orlando, Fla [**36**, 693; cf. **38**, 83; **39**, 78], 3 strs. of [citrus] tristeza virus (T_1 mild, T_1 strong, and T_3 severe) were inoculated by grafting infected Key lime leaf pieces to the stems of young lime, sour orange, Eureka lemon, and Duncan grapefruit seedlings. All plants were then cut back to a single 6-in. main stem with 3 leaves remaining at the upper part; 4 months after

inoculation leaf-piece grafts were made to Key lime; 10 months after inoculation lateral branch growth of inoculated and control plants was compared and bark stripped for pitting to be assessed. The reactions of the 4 spp., which are described, showed that T_1 mild, though detectable on Key lime, did not produce distinctive symptoms on the others, though they were infected. It remained stable after passage through all the spp. T_1 strong, though only slightly affected by passage through sour orange, was recovered from Eureka lemon and grapefruit as a mild str. T_3 was likewise unaffected by Key lime, but was altered in the other 3 spp. These changes were probably due to the presence of str. mixtures in T_1 strong and T_3, the relative ratios of these varying in certain hosts. Tests on 4 Eureka lemon plants, infected for 36–64 weeks, with T_3, showed the influence of this host on multiplication and distribution. Adjacent pieces from the same leaf sometimes produced mild and severe symptoms on Key lime, or even severe symptoms or no reaction. In similar experiments with Key lime, using 1 group of plants cut back at inoculation and another not, both subcultured after 90 days, T_3 moved readily into young leaf tissue, but more slowly into old leaves, where the mild or strong str. mixtures were more prevalent.

On sour orange T_1 strong caused stem pitting, the mild no pits, and T_3 stunting and very few pits, but subcultures to Key limes gave a graded range of pitting, similar to that obtained with subcultures from the original inoculum sources, showing that stem pitting is not due to a different virus str. but is only a symptom related to host-tissue response and the str. mixture present [cf. **34**, 640].

Nagpal (R. L.). **Tristeza found in Bombay State, India.**—*Calif. Citrogr.*, **44**, 12, pp. 392, 402–405, 1959.

This is a fuller account of information already noticed [**38**, 477]. Tristeza virus is present in some of the Mosambi (sweet orange) trees on Jamburi (local rough lemon) rootstocks, which wilt and dry rapidly in their 6th year or later, but Jamburi and the rough lemon used in America may not be quite identical.

Vasudeva (R. S.). Varma (P. M.). & Rao (D. G.). **Transmission of Citrus decline virus by Toxoptera citricidus Kirk. in India.**—*Curr. Sci.*, **28**, 10, pp. 418–419, 2 fig., 1959.

Among the aphids colonizing citrus at Poona, surveyed from Nov. to Mar. 1958, was *T. citricidus*. Characteristic vein-clearing symptoms indicative of citrus tristeza virus [cf. **38**, 596] developed in Key lime seedlings 40–100 days after colonization with aphids previously fed on diseased citrus.

Weathers (L. G.). **Interference and synergistic reactions with reference to yellow vein and other viruses of Citrus.** Abs. in *Phytopathology*, **49**, 9, p. 554, 1959.

Concurrent inoculation of W.I. lime with citrus psorosis and yellow vein [**37**, 234; **38**, 4] viruses induced predominant psorosis symptoms. With yellow vein already present, inoculation with psorosis did not affect the yellow vein symptoms, but the reverse procedure gave results similar to those of simultaneous inoculation. Psorosis symptoms were always more severe with dual than with single infections. Dual infection with citrus yellow vein and vein enation [**34**, 781] viruses increased the severity of both in W.I. lime, sweet orange, and lemon seedlings, either virus alone causing only mild symptoms; the synergistic reactions occurred with both concurrent and successive inoculations.

Sibilia (C.). **Indagini sulla diffusione della xiloporosi degli Agrumi in Italia.** [Researches on the spread of Citrus xyloporosis in Italy.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **16** (*1958*), 2, pp. 183–194, 11 fig., 1959.

Citrus xyloporosis virus [cf. **36**, 526; **38**, 596], the symptoms of which are described

and illustrated, was recorded in Italy for the first time in 1957, by Reichert. At present the disease causes no anxiety, but investigation of control methods has been initiated. Surveys have shown the greatest spread to be in the south. All spp. studied have been found to be affected in one locality or another, including 6 vars. of lemon, 7 of orange, 4 of mandarin, and also citron, grapefruit, *Citrus* [*aurantium* var.] *bergamia*, sour orange, shaddock, lime, and *C. myrtifolia*.

Norman (G. G.), Nixon (R. R.), Horne (L.), & Grantham (J. T.). **Symptoms indicating xyloporosis in uninoculated Orlando Tangelo seedlings.**—*Plant Dis. Reptr*, **43**, 10, pp. 1120–1121, 4 fig., 1959.

Among the Orlando tangelos (*Citrus reticulata* × *C. paradisi*) used since 1953 at the State Plant Board of Fla, Winter Haven, as indicators for xyloporosis virus [**38**, 258] 9 uninoculated seedlings were found with xyloporosis symptoms in 1959. There was no evidence of root grafts.

Grant (T. J.), Grimm (G. R.), & Norman (P.). **Symptoms of cachexia in Orlando Tangelo, none in Sweet Lime and false symptoms associated with purple scale infestations.**—*Plant Dis. Reptr*, **43**, 12, pp. 1277–1279, 1959.

Bud inoculum from 7 sources produced cachexia [cf. **38**, 691] symptoms in Orlando tangelo at the U.S. Dept Agric., Orlando, Fla, but no xyloporosis in sweet lime seedlings, which indicates the existence of 2 different causal viruses, or at least different strs. or str. mixtures of 1 virus. It was also observed that inner bark injuries in Orlando tangelo, sweet lime, and Key lime, closely resembling cachexia symptoms on Orlando tangelo and those of xyloporosis on sweet lime, were associated with purple scale (*Lepidosaphes beckii*) infestation on the bark surface.

Yoshii (H.) & Kiso (A.). **Studies on the nature of insect transmission in plant viruses. VIII. On the incorporation of P^{32} into virus transmitting green broad winged planthopper and virus-infected Satsuma Orange.**—*Ann. phytopath. Soc. Japan*, **24**, 3, pp. 175–181, 4 diag., 1959. [Jap. Abs. from Engl. summ.]

In further studies at the Fac. Agric., Ehime Univ., Matsuyama [cf. **38**, 743], radioactive P^{32} in various P fractions from mandarin orange plants infected by citrus dwarf virus and also in the green broad-winged planthopper vector [*Geisha distinctissima*] was higher than in healthy plants or vectors, but there was no consistent difference between the amounts of P in the various fractions of plant material, though acid-soluble P compounds were much higher in viruliferous insects. Incorporation of P^{32} into the nucleic acids of plants and insects was low, with no difference between healthy and infected.

Akhvlediani (K. S.). Выделение токсического вещества из древесины Лимонов, пораженных мальсекко. [The isolation of a toxic substance from the wood of Lemon trees infected by mal secco.]—*Soobshch. Akad. Nauk Gruz. S.S.R.*, **21**, 1, pp. 89–90, 1958.

The substance was isolated at the Inst. for Plant Protection, Tiflis, from wood infected by *Deuterophoma tracheiphila* [cf. **38**, 406] and was not found in healthy wood.

Stolzy (L. H.), Moore (P. W.), Klotz (L. J.), & DeWolfe (T. A.). **Growth rates of Orange seedlings in the presence and absence of Phytophthora spp. at two levels of irrigation and two levels of soil nitrogen.**—*Plant Dis. Reptr*, **43**, 11, pp. 1169–1173, 1959.

In further studies at Univ. Calif. Citrus Exp. Sta. [**38**, 258; **39**, 104] Bessie sweet orange seedlings were planted in Nov. 1956 in large concrete containers with vapam-fumigated sandy loam [**36**, 584]. By autumn 1958 *P. citrophthora* and *P.*

parasitica, added together to the soil before planting, had reduced the quantity of roots, length and weight of shoot growth, and trunk circumference, but their effect on the autumn flush of growth in the 2nd growing year was much less than previously. $Ca(NO_3)_2$ added to the soil did not appreciably affect the seedlings compared with no soil N application (only foliage urea). Higher irrigation (9 centibars) significantly increased weight of top growth during the 2nd summer growth period over lower irrigation (60 centibars) in both presence and absence of the fungi.

Tamayo (B. P.) & Pordesino (A. N.). **Occurrence of powdery mildew of Citrus in the Philippines.**—*Philipp. Agric.*, **43**, 2–3, pp. 236–239, 2 fig., 1959.

This is the 1st record of this disease (*Oidium tingitanium*) [*O. tingitaninum*: cf. **26**, 101] in the Philippines. At Los Baños, Laguna, in 1959, every tree in one orchard was infected. It was serious in an orchard in Lipa City and in others in the province of Batangas. A report also came from the Bicol area. All were on the mandarin cultivar Laddu.

Miyakawa (T.). **Studies on the green and blue mold of Satsuma Orange (2). Effect of fruit components on the growth of causal fungi.**—*Ann. phytopath. Soc. Japan*, **23**, 4, pp. 193–198, 2 fig., 3 graphs, 1958. [Jap. Abs. from Engl. summ. Received Nov. 1959.]

In further studies [cf. **39**, 171] *Penicillium digitatum* grew more vigorously on media of crushed orange rind than on juice agar, while *P. italicum* grew similarly on both. The stimulating substances in the rind were soluble in water, 80% methanol, or 80% acetone, but not in ether, and were not affected when the rind was desiccated or pasteurized.

Nutman (F. J.). **Evidence that the spores of Coffee leaf-rust are not dispersed by wind.**—*Kenya Coffee*, **24**, 287, pp. 451–453, 4 fig., 1959.

Using a spore trap at Kiambu a max. of 2 spores of *Hemileia vastatrix* [cf. **38**, 693] was secured in about 250 cu. ft. after 1 hr. at 1½ ft. from the nearest coffee tree in a heavily infected plantation. When air-streams of known velocity were directed on to the surface of ripe, sporing pustules, no movement of spores with winds of up to 12 m.p.h. was detected by photographic recording. Branches bearing heavily infected leaves, also single rusted leaves held by the petioles, with spore traps or sticky slides behind them were exposed to air streams. No spores were dislodged from branches at any air-speed up to 7 m.p.h. With single leaves, violent fluttering occurred at 6 m.p.h., and clusters of spores were jerked into the air, but their weight caused rapid settling. As winds in the area are generally mild, it is evident that *H. vastatrix* spores only very rarely become wind-borne. When, however, even the smallest drop of water touches a pustule the mutual adhesion of the spores is destroyed and they float to the surface. The bulk of spore distribution can therefore occur only during rain.

Tarr (S. A. J.). **Seed treatment of Cotton against diseases and insect pests.**—*Outlook on Agric.*, **2**, 4, pp. 168–177, 5 fig. (1 col.), 1959. [32 ref.]

After referring to the heavy losses caused to the cotton crop in British Commonwealth countries [cf. **36**, 44], the United States, and other areas by diseases, the most serious of which in rain-grown cotton in Africa and Asia is bacterial blight (*Xanthomonas malvacearum*) [cf. **36**, 526 *et passim*], the author notes the conditions favouring the development of this disease and the symptoms, and discusses control measures directed to minimizing sources of infection of the newly sown crop. In dealing with the problems of seed treatment, he points out that while acid-delinting is commonly practised in the United States, it is at present impracticable in most

parts of Africa and Asia owing to the danger and expense involved. The available evidence suggests that internal infection of the seed is generally only slight.

Studies on seed treatments with Hg dressings in the Gezira [cf. **33**, 228] are briefly recapitulated, and the different methods of application are described [**36**, 696 *et passim*]. Reference is made to cuprous oxide seed treatment in Uganda [**37**, 354] and elsewhere, and the view is expressed that although it reduces seed-borne infection and thereby gives worth-while over-all yield increases, greater benefits are probably obtainable with Hg [**39**, 229]. There is a section on the control of seed-borne diseases other than bacterial blight, including the wilts caused by *Fusarium oxysporum* f. *vasinfectum* [cf. **38**, 381] and *Verticillium alboatrum* [cf. **36**, 697 *et passim*] (against which seed treatment is of little use), *Ascochyta gossypii* [cf. **33**, 503, 537], *Glomerella gossypii* [cf. **37**, 409, 662], and (in Bombay State, India) *Colletotrichum indicum* [**38**, 145]. A section is also included on the relation between seed treatment and improvement of emergence and stand [cf. **32**, 677].

Вавлеv (F.). Сравнительное испытание препаратов для протравливания механически делинтерованных семян Хлопчатника против гоммоза. [Comparative test of preparations for the treatment of mechanically delinted Cotton seed against gummosis.]—Социал. Сел. Хоз. Азерб. [*Sotsial. Sel. Khoz. Azerb.*], *1959*, 1, pp. 51–52, 1959. [Abs. in *Referat. Zh. Biol., 1959*, 19, p. 198, 1959.]

In trials against bacterial blight [*Xanthomonas malvacearum*: **39**, 25] in 1956–7 at the Azerbaijan sci. Res. Inst. for Cotton Growing seed treatment with 20% Cu trichlorophenolate (3 kg./ton) increased resistance to the various forms of the disease, density of growth, and yield. The preparation is less toxic than granosan and mercuran, adheres well to the seeds, and is without offensive odour.

Staffeldt (E. E.). **Elimination of Verticillium albo-atrum by composting Cotton gin wastes.**—*Plant Dis. Reptr*, **43**, 11, pp. 1150–1152, 1 fig., 1 graph, 1959.

Stem portions of infected cotton were embedded in a compost pile without amendments, in 1 containing added antagonistic fungi, and in 2 with different types of commercial preparation (soil biotics and fertosan). From none was *Verticillium alboatrum* isolated on agar platings 14 days after composting. The max. temp. during the process was 61·7–68·3° C. [cf. **38**, 210].

Lakshmanan (M.). **Respiratory changes in Fusarium-infected Cotton.**—*Phytopath. Z.*, **36**, 4, pp. 406–418, 4 graphs, 1959. [Germ. summ.]

In further studies [**37**, 168] at the Univ. Bot. Lab., Madras, stem and root segments of vars. CO 2 and MU 1 resistant to *F.* [*oxysporum* f.] *vasinfectum* were found to respire at a lower rate than the susceptible K 2; in the latter the rate increases in older plants (14 and 21 days), while in the resistant the increase starts on the 7th day but is followed by gradual decline. The role of metabolic products of the pathogen in the augmented respiration is discussed.

Naim (M. S.) & Selim (K. G.). **Transpiration curves of Karnak Cotton cut shoots in response to Fusarium metabolites.**—*Egypt. J. Bot.*, **2**, 1, pp. 1–16, 4 graphs, 1959. [30 ref. Arabic summ.]

In further studies [cf. **37**, 661] at A'in Shams Univ., Cairo, it was shown that wilting of Karnak shoots provoked by either unheated or autoclaved filtrates of *F. equiseti* [loc. cit.] was effected by a combined agency of a thermostable substance not precipitated by alcohol, a thermolabile alcohol-soluble substance found in the mycelium, and the water/ether-soluble substances contained in the filtrate, of which only the first was responsible for the blocking of the xylem vessels by gum.

Abou Raya (M. A.) & Assawah (M. W.). **A black root-rot on Cotton in Egypt.** — *Egypt. J. Bot.*, **2**, 1, pp. 49–56, 3 fig., 1959. [11 ref. Arabic summ.]

At the agric. Bot. Dept. Alexandria Univ., the roots and hypocotyl of seedlings transplanted from soil to culture solutions were attacked by black root rot caused by *Thielaviopsis basicola* [cf. **27**, 350]. This is believed to be the 1st report for Egypt of infection under experimental conditions.

Fulton (N. D.) & Bollenbacher (Katharina). **Pathogenicity of fungi isolated from diseased Cotton seedlings.**—*Phytopathology*, **49**, 10, pp. 684–689, 2 fig., 1959. [24 ref.]

A more detailed account from Univ. Ark., Fayetteville, of information already noticed [**37**, 662]. The *Pythium* sp. is now identified as *P. ultimum*.

Flor (H. H.). **Differential host range of the monocaryon and the dicaryons of a eu-autoecious rust.** —*Phytopathology*, **49**, 12, pp. 794–795, 1959.

In further studies in N. Dakota [**37**, 663] 25 differential flax vars., monogenic for resistance, were inoculated with sporidia of race 210 of *Melampsora lini* by suspending germinating teleutospores over 4-in. seedlings under a bell jar. Normal pycnidia and aecidia developed on the 6 vars. to which the uredospore culture from which the teleutospores were derived was homo- or heterozygous for high virulence; on vars. to which it was moderately virulent or moderately avirulent, only flecks or minute pycnidia developed. Vars. to which the uredospore culture was markedly avirulent were immune, with the exception of Bombay, which was highly susceptible to the sporidia, though immune from aecidiospores that developed on it and from subsequent F_2 uredospore cultures from these aecidia. In its susceptibility to the monocaryon and immunity from the dicaryon Bombay serves as an alternate host to race 210 of the eu-autoecious *M. lini*.

Bócsa (I.). **A Kender beltenyésztésének újabb jelenségei.** [New phenomena of the inbreeding of Hemp.] *Növénytermelés*, **7**, 1, pp. 1–10, 6 fig., 1958. [Russ., Engl. summ.]

During this programme at the Res. Inst. for Agric., Kompolt, Hungary, some inbred monoecious strains of hemp were found susceptible to *Septoria cannabis* [**35**, 397].

Goidanich (G.) & Ferri (F.). **La batteriosi della Canapa da Pseudomonas cannabina Šutić et Dowson var. italica Dowson.** [A bacteriosis of Hemp caused by *P.c.* var. *italica*.] *Phytopath. Z.*, **37**, 1, pp. 21–32, 6 fig., 1959. [Engl., Germ. summ.]

This disease [**38**, 408], studied at the Inst. di Patalogia vegetale, Bologna, has appeared on hemp systematically for some yr. in N. Italy. In young plants it begins with the formation of many small protuberances situated in longitudinal rows between ridges on the leaf. Later on, in the tissues below, brown-violet necrotic areas are formed, followed by the breaking of the epidermis with the consequent appearance of longitudinal dry yellow wounds. In mature plants, both seed and fibre, elliptical or elongated wax-like, dark grey areas, isolated or confluent, appear in the stem, on which are differentiated small vesicles, 1–2×2–3 mm., filled with a yellowish mucilaginous substance. These vesicles break after a short time and dry, while around this necrotic area other pustules appear, extending the diseased part. In buds the symptoms are similar to those on the stem, while on the leaf-lobes irregular, reddish-violet spots appear, irregularly distributed on the lamina, isolated or confluent, with a light yellow halo. When the main vein is attacked progressive deformation of the leaf lobes and their rapid death follow. Necrosis progresses until it affects the fibres and the wood.

Inoculation with bacterial exudate from diseased plants caused the 1st symptoms to appear in 10 days. The authors do not think that the disease is seed-borne.

Disease in the flower garden.—*Agric. Gaz. N.S.W.*, **70**, 7, pp. 343–354, 382, 18 fig., 1959.

A popular illustrated article for gardeners in which a note on the main causes of plant diseases is followed by generalized notes on soil-borne diseases, diseases of stems and leaves, and standard control measures.

Valenza (F.). **Recenti progressi nella difesa antiparassitaria delle colture floricole.** [Recent advances in the antiparasitic defence of flower crops.]—*Notiz. Malatt. Piante* 49–50 (N.S. 28–29), pp. 55–62, 1959.

After noting the area given up to commercial flower growing in Italy and the great monetary value of these crops the author briefly notes recent advances in the chemical control of the chief fungus diseases of carnation, rose, and gladiolus, mostly already noticed.

Ciferri (R.). **Elenco preliminare delle virosi delle piante da fiore presenti in Italia** [A preliminary list of the viroses of flowering plants present in Italy.]—*Notiz. Malatt. Piante* 49–50 (N.S. 28–29), pp. 3–7, 1959. [Engl. summ.]

A list under the generic names of the hosts (44) of the virus diseases of flowering plants so far recorded in Italy or observed there by the author. The most prevalent appear to be *Lycopersicon* virus 3 [tomato spotted wilt], which is recorded under 12 or more gen., and *Cucumis* virus 1 [cucumber mosaic] (10 gen.).

Uschdraweit (H. A.) & Valentin (H.). **Ein neues Virus an Zier- und Wildstauden.** [A new virus on ornamental and wild herbaceous plants.]—*Phytopath. Z.*, **36**, 2, pp. 122–130, 2 fig., 1959. [Engl. summ.]

In investigations of virus infections of ornamental perennials at the Inst. für gärtnerische Virusforschung, Berlin-Dahlem [**39**, 160], the new 'virus of hardy primroses' was found to be relatively widely distributed, being present in 64 genera in 30 families. Suitable test plants are certain *Chenopodium* spp. Its properties are: thermal inactivation at 63° C. for 10 minutes, dilution end-point 1:500,000–1:800,000, and persistence *in vitro* at room temp. about 80–100 days. Transmission is probably effected through the soil; transmission by aphids and seeds has not yet been demonstrated. No relationship with other viruses seems to exist.

Gill (D. L.). **Reducing Amaryllis leaf spot by spraying.** –*Plant Dis. Reptr*, **43**, 12, pp. 1272–1273, 1959.

According to this report from the U.S. Dept Agric. and Univ. Ga agric. Exp. Sta., Tifton, significant reduction of leaf spot (*Stagonospora curtisii*) on *Amaryllis* spp. [cf. **29**, 154; **34**, 229] was effected by 6 sprays from the small leaf stage until blooming with zineb, ferbam, 50% captan, all at 2 lb./100 gal.+dreft, and copper A at 4 lb./100 gal., this being the order of efficiency.

Hemmi (T.) & Akai (S.). **On the flower-blight of cultivated Azaleas caused by Ovulinia azaliae.**—*Mem. Coll. Agric. Kyoto* 80 (Phytopath. Ser. 13), 20 pp., 5 pl. (1 col., 20 fig.), 3 fig., 1959.

Information on *O. azaleae* [**19**, 412; **32**, 689] on azaleas [*Rhododendron*] is recapitulated. The 9 spp. and 2 vars. tested were susceptible. *R. indicum*, though infected by ascospores, was not susceptible to conidia. The fungus grew between 3 and 32° C. (opt. 22–24°); ascospores and conidia germinated well and 60–80% conidial germination was obtained in distilled water within 4 hr. Sclerotial formation was favoured by varying humidity; the apothecia emerge at the end of Apr. to May when the soil temp. rises above 15° C.

Arya (H. C.). **A note on the pathology of an isolate of Phytophthora palmivora (Butler) Butler on Bougainvillea spectabilis.**—*Sci. & Cult.*, **25**, 2, pp. 156–158, 4 fig., 1959.

In 1955 a severe outbreak of *P. palmivora* on *B. spectabilis* occurred in the gardens of Jaswant College, Jodhpur, India. In inoculation experiments *Quisqualis indica*, *Impatiens balsamina*, and *Zinnia elegans* developed 5, 7, and 6·5% infection of the leaves, respectively, compared with 100% infection of leaves and flowers on *B. spectabilis* [cf. **36**, 426].

Pontis (R. E.) & Feldman (J. M.). **La podredumbre del cuello y las raices de 'Callistephus chinensis' en la Argentina causada por 'Phytophthora cryptogea'.** [Collar and root rot of *C. chinensis* in Argentina caused by *P. cryptogea*.]—*Rev. argent. Agron.*, **26**, 1–2, pp. 17–22, 3 fig., 1959.

A full account of the disease is given from the Facultad de Ciencias Agrarias de la Univ. Nacional de Cuyo. It is the 1st record of infection of China aster by *P. cryptogea* [cf. **17**, 181] in Argentina.

Bestagno (G.), Bestagno Biga (M. L.), & Ciferri (R.). **Osservazioni preliminari su virosi del Garofano.** [Preliminary observations on virus diseases of Carnation.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **16**, pp. 242–252, 7 pl. (2 col.), 1959. [Engl. summ.]

A description is given of virus-like symptoms on carnations growing on the Ligurian Riviera in 1956–58. Plants of the white var. Candido were yellowish-green and some had a witches' broom appearance. On the leaf blades were depressed, chlorotic spots with an indefinite outline, shading from pale green to yellow, and on the flower petals red streaks of various lengths, or spots; the petals sometimes curled up and had minute swellings on them. On Anita Rosa (pink and white) the symptoms were similar but less noticeable. The flowers were rather small and the petals were sometimes curled and laciniated. Manon (red) developed similar symptoms. On severely affected plants symptoms developed in spring; in autumn and winter they were less conspicuous. This may be 'yellows' virus [loc. cit.], possibly with ring-spot symptoms superimposed, and may be the same as the mosaic virus disease previously reported [**30**, 323].

Rosa Nella plants (red) appeared to be rather small when seen in Nov. Both leaf surfaces bore short, narrow, pale lines, mostly running in the direction of the veins; semicircular marks and a mosaic of pale spots developed, the symptoms becoming more severe. The flowers appeared dark from dark spots on a pale ground. This virosis, evident in autumn–spring, is probably due to ring-spot virus [cf. **37**, 286]. No transmission tests have been done.

Bestagno (G.). **La disinfezione con 'vapam' del suolo destinato a garofaneto.** [The disinfection with 'vapam' of soil intended for Carnation growing.]—*Notiz. Malatt. Piante* 49–50 (N.S. 28–29), pp. 188–193, 1 pl., 1959. [Engl. summ.]

At the end of Apr. 1958, the soil of a large carnation planting in Liguria where the plants were sometimes affected by a serious die-back associated with *Fusarium* sp. [cf. **36**, 574], *Verticillium* sp., *Alternaria* sp. [cf. **35**, 94], and *Pleospora* sp., was sprinkled with vapam at the rate of 500 kg./h. and simultaneously watered at 6–8 l./sq. m., after which it was turned over. Planting (Manon var.) was done 10 days later. Excellent control resulted, disease incidence being reduced from 68% in untreated soil to under 1%, while the market value of the flowers was improved. Application of vapam at double this rate gave about the same results.

Hellmers (E.). **Bestråling af nellikestiklinger, plantepatogene bakterier og svampe med gammastråler fra Cobolt.**[60] [Irradiation of Carnation cuttings, plant

pathogenic bacteria, and fungi with gamma rays from cobalt^{60}.]—*Horticultura*, **13**, 12, pp. 201–204, 1959. [Engl. summ.]

Cuttings of perpetual-flowering carnation vars. Pink Sim and Scania (Sim) irradiated at 7,000–1,000,000 r. at the Atomic Energy Commission, Roskilde, Denmark, did not form roots; at 3,000 r. the roots were almost normal and the plants grew well with normal flowers. Plate cultures of *Alternaria dianthi*, *Fusarium culmorum*, *Pectobacterium parthenii* var. *dianthicola* [**37**, 481], and *P. carotovorum* [*Erwinia carotovora*] on potato dextrose agar could withstand 100,000 r.; the bacteria were killed at 300,000, *A. dianthi* at 600,000, and *F. culmorum* at 1,000,000. Gamma rays from Co^{60} therefore cannot control these pathogens without killing the plants.

Petersen (L. J.), Baker (R.), & Skiver (R. E.). **Control of Fusarium stem rot of Carnations : I. Application of fungicides to mother blocks.**

Petersen (L. J.) & Baker (R.). **II. The use of dips and drenches.**—*Plant Dis. Reptr*, **43**, 11, pp. 1204–1208, 3 fig.; 1209–1212, 8 fig., 1959.

Carnation cuttings (Red Gayety and Miller's Yellow), derived from mother blocks inoculated with a spore suspension and given a fungicidal spray 24 hr. later, were rated at Colo. State Univ., Fort Collins, for incidence of *Fusarium* stem rot (*F. roseum* f. *cerealis*) [**37**, 86; **38**, 78]. The best control (9 fungicides, each + wetter) was obtained with the Mn salt derivative of pyridimethione (OM [omadine] 1564) [**36**, 407], with 6 diseased plants after 60 days as against 52 in the untreated inoculated; it also considerably stimulated rooting after 8 applications. As this chemical is not available commercially, captan can be recommended as a substitute.

In II the cuttings were dipped in a conidial suspension of *F. roseum* and then either immersed for 10 min. in the fungicide + tween or planted and drenched. Panodrench 4 (2·6 p.p.m.), panogen experimental material WO 4778 (3 p.p.m.), and ferbam (1,000) proved most effective with no more than 20 diseased plants compared with 71 in the control. Dips and drenches in combination also gave good results but were slightly phytotoxic.

Bateman (D. F.) & Dimock (A. W.). **The influence of temperature on root rots of Poinsettia caused by Thielaviopsis basicola, Rhizoctonia solani, and Pythium ultimum.**—*Phytopathology*, **49**, 10, pp. 641–647, 2 fig., 2 graphs, 1959. [34 ref.]

In a study at Cornell Univ., Ithaca, N.Y., of these fungi concerned in root rots of *Euphorbia pulcherrima* [**35**, 299; **38**, 7] opt. temp. for growth of *T. basicola* on potato dextrose agar was 24° C. by colony diam. and 21° by dry wt. increase; for *R.* [*Corticium*] *solani* 27° and *P. ultimum* 30°, by either method. For all 3, but especially the 2 last-named, there was a much wider opt. range as determined by colony diam. than by dry wt.

Rooted cuttings of Barbara Ecke Supreme were grown in sterilized and inoculated soil with 28% moisture content at 5 soil temps. from 13–30°. Max. root development of healthy plants was at ca. 26°, none at 13°, and very little at 30°. *T. basicola* root rot was max. at 17°, severe from 13–26°, but negligible at 30°. *P. ultimum* infection, also max. at 17°, caused no serious damage at 26° or above. *C. solani* was innocuous at < 17°, but disease severity then increased. *T. basicola* attacks the root system at any point, *P. ultimum* usually begins near the tips, *C. solani* attacks at the soil line [cf. **39**, 110].

Rogers (M. N.). **Decay of Poinsettia cuttings by the soft rot bacterium, Erwinia carotovora (Jones) Holland.**—*Plant Dis. Reptr*, **43**, 12, pp. 1236–1238, 2 fig., 1959.

At Missouri agric. Exp. Sta., Columbia, decay of *Euphorbia pulcherrima* cuttings in the greenhouse was attributed to *Erwinia carotovora*, apparently a new host record. Phytosanitary precautions when preparing cuttings are recommended for control.

Scurti (J. C.). **La fusariosi dei Gladioli. Caratteri dei ceppi di Fusarium isolati e prove orientative di lotta.** [Fusariosis of Gladioli. The characters of the strains of *Fusarium* isolated and preliminary experiments on control.]—*Notiz. Malatt. Piante* 49–50 (N.S. 28–29), pp. 145–160, 1959. [Engl. summ. 31 ref.]

After describing the characters of 3 strs. of *F. oxysporum* f. *gladioli* isolated from yellows-diseased plants in Italy [cf. **35**, 186], the author summarizes control methods recently tested there and elsewhere [cf. **33**, 83; **35**, 297; **37**, 18] and describes his own experiments, begun in Piedmont in 1955–6. Corms should be dried at temps. eventually reaching 35° C. and dusted. In spring dormant corms should be given a wet treatment. Planting should be early, so that root development may be completed before the temp. reaches the opt. for infection. During growth spraying is necessary, with oxyquinoline sulphate twice weekly during the 1st month and once weekly during the 2nd, but not during flowering. Resistant vars. should be used.

Sharma (B. B.). **Plant disease in relation to nutrition. 1. Effect of nitrogen, potassium and phosphorus on the leaf blight of Hollyhock.**—*Curr. Sci.*, **28**, 11, pp. 440–441, 2 fig., 2 graphs, 1959.

A newly recorded leaf blight of hollyhock caused by *Alternaria tenuis* was investigated at the Dept Bot., Univ. Lucknow, India. Initially pale brown, irregular spots developed at the tips and margins of the leaves, extending later to the petiole. There was subsequent drying of the necrotic areas, sometimes causing holes. Young leaves remained uninfected until late in the season. The pathogen entered only through the stomata or injured areas and only via the lower leaf surface. Addition of N to the soil accelerated disease incidence, whereas an increase of P, and to a lesser extent K, retarded it and increased resistance.

Mathur (R. L.) & Mathur (B. L.). **A new species of Curvularia from the leaves of Jasminum sambac.**—*Curr. Sci.*, **28**, 11, pp. 448–449, 1 fig., 1959.

In Kota public gardens, Rajasthan, a dark brown discoloration of the leaves of jasmine was associated with *Curvularia prasadii* Mathur & Mathur, described from the Agric. Dept as having conidiophores 80–320 × 3·2–4·8 μ and conidia 18·0 × 9·1 (12·8–25·6 × 8·0–12·8) μ.

Gill (D. L.). **Effects of soaking Easter Lily bulbs in puratized agricultural spray or demeton, or in combined soaks, on aphids, black scale and yield.**—*Plant Dis. Reptr*, **43**, 12, pp. 1274–1276, 1959.

At the U.S. Dept Agric. and Univ. Ga agric. Exp. Sta., Tifton, it was shown that a 1 hr. soak in demeton 1–500 could follow a 24 hr. soak in the puratized agricultural spray 1–500 [cf. **27**, 186] against black scale (*Colletotrichum lilii*) [**38**, 522], or the 2 chemicals be used together without mutual interference, but as the puratized agricultural spray reduces bulb yield it should only be used when black scale is present.

Some diseases of Geranium. *Agric. Gaz., N.S.W.*, **70**, 8, pp. 412–417, 7 fig., 1959.

Pelargonium spp. in N.S.W. are attacked by leaf rust (*Puccinia pelargonii-zonalis*), which is controlled by spraying with colloidal S or zineb (1 oz./3 gal.) every 7–10 days during the warm months. *Botrytis cinerea* causes the flowers to fade and die prematurely. *Cercospora brunkii* induces small light brown, roughly circular leaf spots with a narrow, slightly raised and darker border; plants should be well spaced and if severe attacks occur sprayed every 7–10 days with captan (2 oz., 3 gal.) or Cu oxychloride (1 oz.). *Pythium* rot [**36**, 576] attacks cuttings as well as mature plants and calls for soil sterilization. *Xanthomonas pelargonii* [cf. **37**, 538] causes leaf spot and stem rot, both controlled by spraying with Cu oxychloride after removal of

diseased parts. Crown gall (*Agrobacterium tumefaciens*) is not usually troublesome. The virus diseases recorded are pelargonium mosaic, leaf curl (transmitted by *Macrosiphum pelargonii*), and greening virus, which induces brooming and flower distortion.

Kröber (H.). **Phytophthora cactorum (Leb. et Cohn) Schroet. var. applanata Chest. als Erreger einer Zweigkrankheit an Rhododendron.** [*P. citricola*, agent of a twig disease of Rhododendron.]—*Phytopath. Z.*, **36**, 4, pp. 381–393, 6 fig., 1 graph, 1959. [Engl. summ.]

This report from the Inst. für Mykologie, Berlin-Dahlem, claims to be the 1st record in Germany, and possibly in continental Europe, of *P. citricola* [**37**, 148]. The symptoms on buds, twigs, and leaves of *Rhododendron catawbiense* are the same as those of the die-back or tip-blight caused by *P. cactorum* [cf. **32**, 129; **33**, 523].

Rosen (H. R.). **Preliminary report of the systematic activity of captan when applied to the soil for the control of black spot of Roses.**—*Plant Dis. Reptr*, **43**, 11, pp. 1176–1177, 1 fig., 1959.

At Univ. Ark., after a sufficient amount of infection and inoculum of *Diplocarpon rosae* [**38**, 211] had been allowed to develop in rose plots the first application of 50% captan wettable powder [cf. **37**, 603] was made on 24 Apr., 5 lb./25 sq. ft. being worked lightly into the topsoil and again a month later. Within a few weeks after the 1st treatment there was considerably less black spot (traces only) than on untreated plots (30%) and less than on most plots that had received the usual applications of fungicides (5–10%). Captan failed to control powdery mildew (*Sphaerotheca pannosa*) and anthracnose *Elsinoe* [*Sphaceloma*] *rosarum* [**35**, 368]. The results obtained are regarded as indicative only and need further confirmation.

Dutta (A. K.) & Hussain (S. M.). **Leaf spot of Rose caused by Curvularia lunata (Wakker) Boedijn.**—*Curr. Sci.*, **28**, 10, p. 413, 1959.

Light brown spots on rose leaflets, common at Sabour, India, caused them to turn yellow, start drying, and sometimes to fall. *C. lunata* [cf. **35**, 228: **37**, 455], a new host record for India, was isolated and proved pathogenic to rose.

Sauthoff (W.) & Gerlach (W.). **Über eine bisher nicht bekannte Blattfleckenkrankheit an Haemanthus (Tourn.) L. (Erreger : Fusarium moniliforme Sheld. var. subglutinans Wr. et Rg.).** [On a hitherto unknown leaf spot disease on *Haemanthus* (causative agent: *Gibberella fujikuroi* var. *subglutinans*).]—*Phytopath. Z.*, **36**, 2, pp. 163–168, 5 fig., 1959. [Engl. summ.]

The disease was 1st observed on var. König Albert in a greenhouse at the Biologische Anstalt, Berlin-Dahlem, in 1957. Pathogenicity of the fungus isolated was demonstrated in infection and re-isolation experiments. It was pathogenic also to *Hippeastrum* but not to *Sansevieria trifasciata* [cf. below].

Gerlach (W.). **Untersuchungen über die Fusarium-Blattfleckenkrankheit an Sansevieria-Arten und ihren Erreger (Fusarium moniliforme Sheld. var. minus Wr.).** [Studies on *Fusarium* leaf spot disease of *Sansevieria* spp. and its agent (*Gibberella fujikuroi* var. *minus*).]—*Phytopath. Z.*, **36**, 3, pp. 270–285, 8 fig., 1959. [Engl. summ.]

This leaf spot disease of *Sansevieria*, widespread in W. Germany, is reported from the Inst. für Mykologie, Berlin-Dahlem, on *S. dooneri*, *S. ehrenbergii*, *S. stuckyi*, *S. nilotica*, and *S. trifasciata* and its vars. *laurentii*, *hahnii*, and *craigii*. Pathogenicity of the fungus was demonstrated on *S. trifasciata* [**34**, 597]. *Fusarium oxysporum*, *F. solani*, and *Colletotrichum gloeosporioides* [*Glomerella cingulata*] isolated from

Sansevieria leaf spots were not able to produce the typical leaf spot symptoms. Inoculations with 5 isolates of *G. fujikuroi* and *G. f.* var. *subglutinans* from other host plants [cf. above] were also negative. Plants should be raised with min. atmospheric humidity, infected leaves cut out as soon as possible, and, if necessary, plants sprayed with Bordeaux mixture or fuclasin+wetter.

Bhargava (K. S.) & Joshi (R. D.). **Observations on a virus disease of garden Nasturtium (Tropaeolum majus L.) occurring in Naini Tal.**—*J. Indian bot. Soc.*, **38**, 3, pp. 379–382, 1 pl., 1959.

This disease was caused by what is possibly a str. of Tropaeolum ring spot virus [cf. **30**, 40; **33**, 84]. It was found in the garden of D.S.B. Government Coll. The virus is non-persistent, was transmitted by *M. persicae* and *Brevicoryne brassicae* but not by *Macrosiphum pisi* [*Acyrthosiphon pisum*], and was transmitted to 8 spp. of Solanaceae and Leguminosae.

Yamaguchi (A.). **Studies on the Tulip mosaic disease in Japan. I.**—*Ann. phytopath. Soc. Japan*, **23**, 5, pp. 240–244, 4 fig., 1958. [Jap. Abstr. from Engl. summ. Received Nov. 1959.]

At the Fac. Agric., Nagoya Univ., Anzyo, sap from tulips affected by a mosaic disease current on them in central Japan was inoculated mechanically to *Lilium formosarum* seedlings, in which it produced leaf mottle or streak followed by leaf and flower distortion. Inoculation to a number of test plants for cucumber mosaic virus gave negative results and the causal virus is believed to be tulip mosaic (tulip breaking) virus [cf. **38**, 750], but whether the colour adding or colour removing variant [**12**, 292] is as yet unknown. The presence of the virus in tulip petals, leaves, and bulbs was demonstrated by inoculation to *L. formosarum*, but sap inoculations from a resistant var. or suspected carrier vars. were negative.

Warren (R. G.) & Benzian (B.). **High levels of phosphorus and die-back in yellow Lupins.**—*Nature, Lond.*, **184**, 4698, p. 1588, 1959.

This study by Rothamsted exp. Sta. began with the observation that yellow lupins grown with fertilizer on a very acid soil in a Forestry Commission nursery near Wareham, Dorset, suffered from a leaf die-back often leading to the death of the plants. Early symptoms were incurved leaves dying off near the tip and occasionally developing translucent patches and brown spots; finally the leaves turned grey and dropped. Chemical analysis showed that the severely affected plants contained 2·2% P, the level in healthy being 0·6%. A higher P level in lupins and the resulting die-back were induced in pot experiments by adding P compounds to the soil. At 64 mg. P/plant the effect was almost invariably lethal. Yellow lupins from a nursery near Oxford, however, developed normally with the same fertilizer, but on a less acid sandy loam. On the other hand, conifer seedlings on the Wareham soil not only remained healthy but also grew better with superphosphate.

Beleva (Lilya S.). Изучавания върху някои морфологически и биохимически изменения на Слънчогледа при внедряване на гъбата **Plasmopara halstedii Farlow.** [Study of some morphological and biochemical changes in Sunflower on inoculation with the fungus *P. halstedii*.]—Науч. Труд. Агрон. Фак., София [*Nauch. Trud. Agron. Fac., Sofia*], **6**, pp. 329–337, 6 graphs, 1959. [Russ., Germ. summ.]

At the Section of Phytopath., agric. Univ., Sofia, sunflower plants inoculated with *P. halstedii* [cf. **38**, 411] developed simultaneously increased catalase and peroxidase activity (a natural protective reaction) and increased excretion of water by the leaves, shorter internodes, and a reduction in length of leaf lamina and stalk. These changes were apparent in the whole plant, not only the infected leaves.

Novikova (Mme N. D.). Ложномучнистая роса Подсолнечника в Краснодарском крае. [False mildew of Sunflower in the Krasnodar area.]—Науч. Докл. высш. Школ. [*Nauch. Dokl. vŷssh. Shkol.*], Biol. Sci., *1958*, 2, pp. 83–88, 3 fig., 4 graphs, 1958.

Investigations at the Dept of Lower Plants, M. V. Lomonosov Moscow State Univ., showed that in the summer 1957 in the Krasnodar area oospores of *Plasmopara halstedii* [cf. above] started to develop in the 2nd 10 days of May when the sunflower was at the 3rd leaf pair stage. Oogonia (42–55 × 38–42 μ) during summer develop only in the cortex of the fine adventitious roots of 0·2–1 mm. diam. or very rarely in the main root: both darken as the result of their presence. Oospores (27–32 μ diam.), found in the fine adventitious roots in mid Aug., were light brown with a paler, slightly warted wall. Spores of this kind were isolated all through the summer from the rhizosphere soil of infected plants (15–30 oospores/g. soil). An entirely new type of sporangium developed on sunflower roots, differing from those on the leaves in being larger (15 × 15–54 × 42 μ, av. 29–38 × 29–38 μ) and more varied in shape (pyriform or lemon shaped to spherical). They frequently developed on longer (300–500 × 8·5–10 μ), weakly branched sporangiophores. These sometimes had comparatively long sterigma with secondary branches up to 500 μ long. Their function is the secondary infection of neighbouring plants through the root system. This secondary infection is not injurious to the plant or to seed yield. Diseased plants, however, contaminate the soil. The period of susceptibility to secondary infection is limited, lasting from the formation of 4–5 leaf pairs to the beginning of anther formation.

Éĭvatova (Mme A.). Азәрбайчан ССР-дә яйылмыш Ем отларынын хәстәликләри наггында. [On widespread diseases of fodders in the Azerbaijan S.S.R.]—Изв. Акад. Наук Азерб. ССР [*Izv. Akad. Nauk Azerb. S.S.R.*], Ser. biol. agric. Sci., *1958*, 1, pp. 23–33, 1958. [Azeri with Russ. summ.]

In this study from the Dept of Phytopath., sci. res. Cotton Inst., 17 diseases caused by fungi and bacteria are described on 8 spp. of herbage plants in Azerbaijan. Diseases of lucerne were the most important [cf. **38**, 149], and included *Pseudopeziza medicaginis* and *Uromyces striatus* on lucerne and *Medicago falcata*, and *P. jonesii* and *Leveillula taurica* f. *medicaginis* on lucerne. Among the other diseases are *Pseudomonas holci* on *Sorghum sudanense* and *Ramularia onobrychidis* on *Onobrychis sativa*.

Mühle (E.) & Schumann (K.). **Zur Frage des Auftretens und des Nachweises der Strichelvirose des Knaulgrases in Deutschland.** [On the occurrence and demonstration of the streak virus on Cocksfoot grass in Germany.]—*Phytopath. Z.*, **36**, 3, pp. 314–316, 1959.

This note from the Inst. für Phytopathologie, Karl Marx Univ., Leipzig, postulates that cocksfoot streak virus [**37**, 651] on *Dactylis glomerata* may be of greater importance in central Germany than has been assumed hitherto.

Kreitlow (K. W.) & Juska (F. V.). **Susceptibility of Merion and other Kentucky Bluegrass varieties to stripe smut (Ustilago striiformis).**—*Agron. J.*, **51**, 10, pp. 596–597, 1 fig., 1959.

When 10 vars. and experimental selections of *Poa pratensis* were sown at the Crops Res. Div., Beltsville, Md, in May 1956 and the incidence of *U. striiformis* [cf. **25**, 264 *et passim*] was assessed in 1958, it was found that while most vars. averaged 1 smutted tiller/sq. ft. the av. for breeder Merion was 40 and for commercial, 32. These 2 also had 73 and 85% infected sod plugs ($2\frac{1}{4}$ in. diam.), respectively, as against 5% or less for Park, Newport, K-34, and K-1.

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